April, 1953

THE CHEMIST

VOLUME XXX NUMBER 4

R. LINDLEY MURRAY

Receives Honorary AIC Membership

(See page 179)

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The CHEMIST

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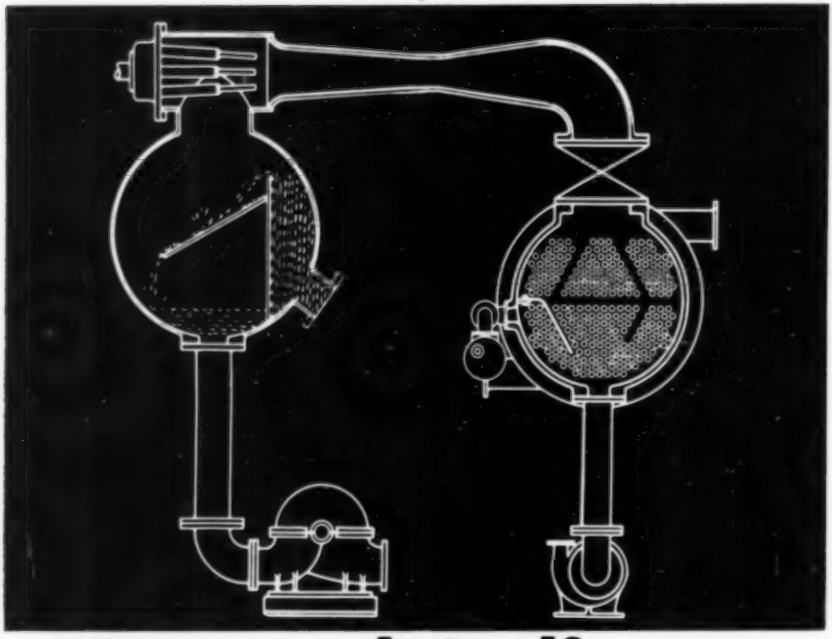
The Right to Choose, Dr. Roger Adams, Hon. AIC.

Keeping Abreast of Scientific Advances in Cosmetic Chemistry, J. R. Martin.

IN THIS ISSUE

AT YOUR SERVICE



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EDITORIAL

The Price of Freedom

Dwight Moody, Chemical Editor, the Journal of Commerce, New York, N. Y.

(Reprinted through courtesy of the Journal of Commerce.)

THE symposium on public relations, sponsored jointly by the New York Chapter of the American Institute of Chemists and the New York Section of the American Chemical Society, was a significant and constructive meeting.

It was significant in that it evidenced a recognition by these two prominent professional groups of the importance of public relations activities at the "grassroots"—by chemists in their local communities.

It was constructive in that not just the material advantages to the individual chemist of human and public relations efforts were touched on, but because particular attention was given in the discussions to the importance of improving public relations as a means of bettering the individual's professional standing and protecting his professional freedom.

* * * *

For instance, President J. C. Warner of Carnegie Institute of Technology, noted, in discussing academic freedom:

"If professors conscientiously accept academic responsibility, society will have confidence in higher learning and the professors will enjoy academic freedom."

Dr. Warner went on to point out that academic responsibility implies, among other things, that the professor cannot claim academic immunity for his statements inside or outside the laboratory, that he cannot expect to have his university connection and responsibilities ignored in judging his public utterances and behavior, and that he must be willing to take part in evaluating the competence, reliability and responsibilities of his fellow professors.

* * * *

Dr. Warner's statement would be just as true if, in place of the words, "university" and "professor," in his statement, the following terms in like order were used: "industry" and "company"; "profession" and "chemist."

Put in another way: Unless companies, in an industry, or members of professional groups, are willing through individual and collective efforts to merit and win public confidence for their industry or profession they risk loss of individual freedom—they increase the threat of interference and regulation from outside.

NOTE: The papers at the Symposium are being published in this and later issues of THE CHEMIST. See page 207.

STEEL CHEMISTS...

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THIRTIETH ANNUAL MEETING

THE BENJAMIN FRANKLIN HOTEL • PHILADELPHIA, PA.

May 12th and 13th

Symbol of the rights, privileges, and responsibilities which are ours through the Declaration of Independence, Philadelphia is an appropriate location for the Thirtieth Annual Meeting of the Institute. The program will follow the pattern of recent annual meetings which have proven so popular and effective. One group of concurrent sessions is devoted to the working relation of the chemists to their fellows, while the other group of concurrent sessions is devoted to the present state of technologic development in progressing industries, with the medical and biological areas receiving extra attention at this time. The general sessions have changed their emphasis more toward the professional side, and are balanced to supplement the earlier sessions. The many who know Dr. Warner will be particularly happy to welcome him as Gold Medalist.

Monday, May 11th

5:00 P.M. President's Reception to National AIC Council (President's Suite).

6:15 P.M. Dinner and meeting of the National Council (Independence Room).

Meeting of the AIC Board of Directors (Independence Room).

Tuesday, May 12th

8:00 to 9:30 A.M. Registration (Mezzanine Floor).

Pre-registration (received before May 5th):
AIC Members $2.00—Non-Members $3.00
Students $1.00

Registration at door:
AIC Members $3.00—Non-Members $4.00

There is no registration fee for wives of registrants.
Headquarters for the ladies, Lafayette Room.

Coffee Hour (Ballroom Foyer) (no charge).

10:00 A.M. Annual AIC Business Meeting (Crystal Ballroom).

AGENDA

Report of President Work.
Report of the Secretary.
Reports of the Chapters.
Reports of the Committees.
Announcement of the election of Councilors.
Introduction of Incoming Councilors.
New Business.

12:15 P.M. Informal Luncheon (Crystal Ballroom) Tickets $3.25.

Speaker: Charles E. Peterson, Architect, National Park Service, "The Restoration of the Historical Areas of Philadelphia." Color Slides.

2:00 P.M. **Concurrent Session A (Crystal Ballroom).**

Panel Discussion, "The Intangibles which Surround Research Administration."

Panel Leader, Dr. R. H. Boundy, Vice President for Research, Dow Chemical Company.

Speakers: C. C. Brumbaugh, Director of Research and Development, Diamond Alkali Company.
R. F. Brown, General Manager of Research and Development, Spencer Chemical Company.
Dr. N. A. Shepard, Chemical Director, American Cyanamid Company.

J. M. Tinker, Director, Jackson Laboratory, Organic Chemicals Dept., E. I. du Pont de Nemours & Co.
W. A. LaLande, Jr., Manager, Research and Development, Pennsylvania Salt Manufacturing Company.

Karl Pfister, Director of Process Research, Merck & Company.

Concurrent Session B (Betsy Ross Room).

Subject, "Recent Advances in Medicinal Chemistry."

Chairman, L. Earle Arnow, Ph.D., M.D., Director of Research, Sharp & Dohme, Inc.

"The Present Status of Immunization Against Poliomyelitis," J. M. Ruegsegger, M.D., Director of Clinical Research, Lederle Laboratories, American Cyanamid Company.

"The Present Status of the Therapy of the Collagen Diseases," Joseph J. Bunim, M.D., Chief, Arthritis and Rheumatism Branch, National Institute of Arthritis and Metabolic Diseases, National Institute of Health.

"The Present Status of the Therapy of Tuberculosis," Lawrence B. Hobson, M.D., Ph.D., Associate Medical Director, E. R. Squibb Division, Mathieson Chemical Co.

"The Present Status of the Therapy of Acute Infectious Diseases," William P. Boger, M.D., Medical Director, Sharp & Dohme.

6:00 P.M. Social Hour (Betsy Ross Room).

(No dinner plans are announced so that individuals may make their own arrangements for this evening.)

Wednesday, May 13th

8:00 A.M. Council Breakfast (Independence Room).

9:00 A.M. Registration — continued. (Mezzanine Floor).

9:30 A.M. **Concurrent Session C (Crystal Ballroom).**

Panel Discussion, "Evaluation of Technical Personnel."

Panel Leader, W. R. G. Bender, Psychologist, Employee Relations Dept., E. I. du Pont de Nemours & Company.

Panel Members: Representatives of a group of major industrial companies.

Concurrent Session D (Betsy Ross Room).

Subject: "Recent Advances in Industrial Chemistry."

Chairman, C. P. Neidig, White, Weld & Company.

"Soil Conditioners," R. M. Lawrence, General Development Dept., Monsanto Chemical Company.

"Titanium," S. F. Radtke, Pigments Dept., E. I. du Pont de Nemours & Company.

"Fluorochemicals," R. Adams, Minnesota Mining & Manufacturing Company.

"Silicones," J. T. Coe, Sales Department Manager, Chemical Div., Silicone Products Dept., General Electric Company.

"Polyethylene," Roger Williams, Roger Williams, Inc.

12:15 P.M. **Honor Recipients' Luncheon (Crystal Ballroom).** Tickets $3.25.

(An opportunity to meet Gold Medal Recipients, Honorary Membership Recipients, and the current Recipients of the Chapter awards.)

Toastmaster: Dr. Emil Ott, Director of Research, Hercules Powder Co.

Presentation of Honorary Membership to Dr. J. C. Warner, President of Carnegie Institute of Technology: Dr. Lincoln T. Work, AIC President.

2:00 P.M. General Session (Crystal Ballroom).

"Quo Vadis," Dr. Lincoln T. Work, AIC President.

"The Future of Research," Dr. Maurice Nelles, Director of Central Research, Borg-Warner Corporation.

"Supply and Demand for Engineers," Dr. Thomas H. Chilton, Chairman, Engineering Manpower Commission, Engineers Joint Council.

"The Progress of Individuals in Their Profession," Robert F. Moore (Author of "How Am I Doing"), General Manager, Richardson, Bellows & Henry, and

"Creative Thinking as a Management Development Process," Dr. Elliott Danzig, Manager, Philadelphia Office of Richardson, Bellows & Henry.

5:30 P.M. Reception to Medalist (Betsy Ross Room). Courtesy of Fisher Scientific Company.

6:45 P.M. Gold Medal Dinner (Crystal Ballroom). Tickets $5.50.

Toastmaster: Dr. Edward R Weidlein, President, Mellon Institute.

Speaker for the Medalist: Dr. Walter J. Murphy.

Presentation of the Gold Medal: Dr. Gustav Egloff, Chairman of the Jury on Medal Award.

Acceptance Address: Dr. J. C. Warner, President of Carnegie Institute of Technology, Pittsburgh 13, Pa.

PLEASE NOTE

Non-members are invited to register and to attend sessions and social activities at the Annual Meeting.

Ladies: Mrs. Hillary Robinette will see that the ladies attending this Annual Meeting have an enjoyable time. Headquarters for the ladies: Lafayette Room.

It is important that advance registration be received, so that adequate accommodations can be provided. Your tickets will not be mailed to you, but will be held in your name at the Registration Desk for you to receive on the day of the meeting.

Please send your reservations, for all the events you wish to attend, before May fifth. Your money will be returned if cancellations are received by May sixth.

Dress for the Medal Banquet is optional. Seats will not be reserved.

Please make all checks payable to The American Institute of Chemists.

Reservations for hotel rooms should be sent directly to the Benjamin Franklin Hotel, Chestnut Street at Ninth, Philadelphia, Pa. The hotel reservation form below may be used.

Annual Meeting Committees

Honorary Co-Chairmen of the Annual Meeting. Dr. E. R. Weidlein and Dr. Emil Ott.
Program: C. P. Neidig, Dr. George S. Rugar, Dr. Nolan B. Sommer.
Arrangements: Marcus Sittenfield, 1411 Walnut St., Philadelphia 2, Pa.
Special Events: Hillary Robinette, Ardmore, Pa.
Ladies: Mrs. Hillary Robinette.
Treasurer and Reservation Chairman: John H. Staub, Barrett Div. Allied Chemical & Dye Corp., Margaret & Bermuda Sts., Philadelphia 37, Pa.
Publicity and Registration: Dr. Walter W. Thomas, Hercules Powder Co., Experiment Station, Wilmington 32, Del.

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Double Room with Twin Beds	$13.00 and $14.00 Per Day
Suites of Living Room ,Twin Bed Room and Bath	$20.00 Per Day
Suites of Two Twin Bed Rooms. Connecting Bath	$20.00 Per Day
Cot Placed in Room	$2.50

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To AIChE Members

The Philadelphia-Wilmington Section of the American Institute of Chemical Engineers and the Department of Chemical Engineering at the University of Pennsylvania, are holding an all-day meeting in Philadelphia, May 12th. Subject: Chemical Engineering in the Process Industries. The meeting will conclude with a dinner at the Penn Sheraton Hotel, at which Dr. C. G. Kirkbride, vice president of the AIChE, will discuss the future plans of that organization. T. W. Tomkowit, of the Chambers Works of E. I. du Pont de Nemours & Co., Penns Grove, N. J., is receiving registrations. Members of the AIChE may make their own arrangements with Mr. Tomkowit.

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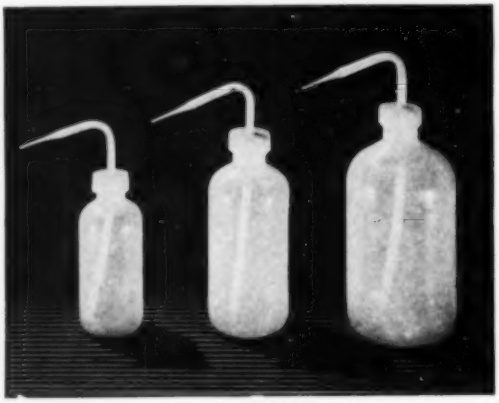

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WASHING BOTTLES, Squeeze Type, Polyethylene. Of chemically resistant pure polyethylene, flexible, tough, lightweight and practically unbreakable. Squeezing produces a steady controllable stream or a few drops, as desired, with delivery stopped instantly when pressure is released.

This formulation is inert to distilled water, buffered, acidic or alkaline wash solutions and is not significantly attacked by corrosive solutions such as concentrated Hydrogen Peroxide, but is not recommended for use above 70° C or for volatile organic solvents.

Both screw cap and delivery tube are of polyethylene. Delivery tube has carefully formed tip and screw cap has a small vent to prevent dripping caused by overpressure resulting from rise in room temperature.

9823-E. **Washing Bottles, Squeeze Type, Polyethylene,** as above described, complete with vented screw cap and delivery tube.

Capacity, ounces	4	8	16
Diameter of bottle, inches.	1-7/8	2-1/4	3
Each	.76	.89	1.05
Per Dozen	8.19	9.60	11.32

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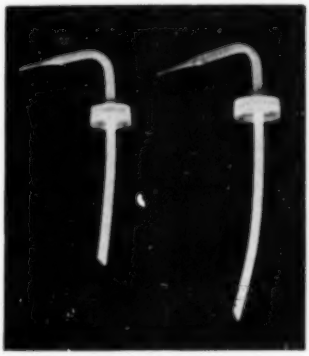

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The Development of Young Men for Positions of Greater Responsibility

R. Lindley Murray, Hon. AIC

President, Hooker Electrochemical Company, Niagara Falls, N. Y.

(Delivered at the February fourth meeting of the Niagara AIC Chapter on the occasion of receiving Honorary AIC Membership.)

WHEN Sidney D. Kirkpatrick received this same award of Honorary AIC Membership in New York on October ninth, the title of his excellent acceptance speech was "Chemists are Human Beings." My acceptance will also be non-technical, and I have chosen "The Development of Young Men for Positions of Greater Responsibility" as my subject because this subject is one in which I am keenly interested. In fact, I am more interested in it than in any other business subject.

Three years ago I wrote a short article on "Executive Training and Development" which appeared in the Institute of Chemical Engineers' "Chemical Engineering Progress" (March 1950). Within the past few days, I have re-read what I wrote then and I have also read many fine articles on this general subject. In addition, I myself have had three more years of working at it, and yet I find that I really cannot change what I said three years ago very much, if at all.

The training and development of young men so that they can be better prepared to take on more responsibility is one of the most important phases in the chemical industry today and, if anything, is more important than at any time in the past due to the tremendous expansion of our industry and resulting shortages of manpower. The widespread adoption of retirement plans, usually including compulsory retirement at age 65, has made more room at or near the top for younger men in many, many organizations, and this has greatly emphasized the necessity for training plans which will fit these younger men for the more responsible positions they will be holding sooner than they think.

The development of a strong second team which is trained to take over top responsibility five, ten and fifteen years hence is a major concern in all wide-awake and up-and-coming companies. As a matter of fact, there never seems to be an oversupply of young or middle-aged men who have clearly proved that they are capable of taking on top responsibility.

The first step in the selection, training and development of the young men who will be taking over top positions in the future is the appraisal and selection of new employees. The calibre of the men who will be running the company in the years ahead depends to a considerable extent, but by no means entirely, on the skillful selection and hiring of young men of latent ability. This is not an easy task with the present technical manpower shortage.

It is important that these new men be assigned to jobs for which they are at least reasonably well fitted, and books have been written to suggest how this can best be done. Personally, I do not care too much about what the new man first goes to work at. If he is willing to word hard, if he has initiative and some imagination, and if he has the knack of getting along well with his fellow workers, his head will begin to stick up a little above the pack. His special aptitudes will become more clearly evident to his supervisor and he will become eligible for special assignments where he will become more useful. Here is one of the first places where management must not fall down, namely detecting and recognizing above-average ability. At about this stage, a rating of the employee by his immediate supervisors should be helpful and is being done more and more in progressive companies. Full benefits to the employee from such a rating can never be achieved unless the rating is tactfully but frankly discussed with the man involved. I have frequently seen great benefits resulting from such discussions and, in my opinion, management is falling down on one of its most important responsibilities if it fails to follow up personnel ratings with friendly and helpful discussions with the men being rated.

Much could be said about these employee ratings. Some rating forms are excellent, others are mediocre or poor. We have tried many before adopting the one we are now using and it is far from perfect. Obviously, certain characteristics are more important than others. Initiative, imagination, cooperation with others, willingness to work hard, common sense and judgment, all are important.

I know of no better advice to a young man just starting in at a job than to "do whatever is assigned to you, the very best you possibly can." If this advice is followed over a period of years, and if the man has fair ability to start with, his future will be assured in the vast majority of cases.

Somewhere along the line, it will gradually become fairly clear as to which young men are showing the most promise. This is a point at which management has an important responsibility and one which it all too often falls down on. It is now up to management to work out a series of assignments which will give to its

promising young men a varied experience, extending over a period of years, in different phases of the company's activities. This is, in effect, job rotation. Frequently, there arises the question of added expense, too much overhead, etc. I firmly believe that this fear is erroneous nine times out of ten. If the man being trained for the future is as promising as he should be at this stage, he will pull his own weight in the boat and more. Even if this were not the case, what better investment can be made than the proper training of those men who are to make up the management team a few years hence?

It is comparatively easy to invite trainees to attend important executive conferences so that they can become familiar with the problems which need to be solved, and to observe how these problems are dealt with by experienced executives. Unfortunately, it is all too easy for busy men to forget to invite trainees to such meetings, attendance at which could afford invaluable experience and training. In my company, we make it a point to invite two or three of our younger men to each Directors' Meeting and we rotate this around so that we cover ten or fifteen of our promising younger men during the course of a year. This is much appreciated by the guests and we believe constitutes a very real element in their training.

We also make it a point to include some of our younger men at luncheons, dinners, out-of-town trips, etc., all in the interest of broadening their point of view and giving them more background.

Communication between top management and the men somewhat lower down the line is most important, and again is often sadly neglected. The best form of communication is, of course, to hear it directly from the horse's mouth, the horse in this case being some member of the top management team. We make a very real point of calling our principal men together to inform them of promotions, financing and expansion plans, and other important happenings. We think it is very important for our supervisory group and some others to be informed by word of mouth rather than to read it in tomorrow's papers. We do not use our bulletin boards for such purposes. The company magazine is a helpful medium for transmitting certain types of information, and we always include in it a simplified digest of what appears in the Annual Report to Stockholders. All these things play a part in the training of our younger men. Monthly meetings of foremen and supervisors attended by management are an important factor, as are frequent meetings between department heads and management.

We have developed a very helpful and, we believe, unique form of flexible organization chart which was

described in *Chemical Week* for January 3rd, 1953. These charts are really a visual-aid personnel spotter and can easily be adjusted to reflect changes in organization and titles. They are arranged to flag which men will retire in the near future, and which men are technically trained. Each man's training and experience prior to and after hiring, together with his age, length of service, etc., are recorded on a removable card which also carries his photograph. We have found this device to be very helpful in showing up replacements which are going to have to be made in the near future, and even in selecting men to fill the vacancies indicated.

We are doing our best to have an able runnner-up for each important management job and each of our top management team fully realizes that one of the surest ways to get ahead is to develop an able man who can step into his job and hopefully fill it even better than he can. It has been very gratifying to me to see how widespread this viewpoint has now become.

Advanced management or business administration courses at many of the universities are playing an increasingly important part in the training of executives. Increasing enrollment in these courses, with the bills footed by the company, is a very direct commentary on the value management attaches to them. Generally speaking, these courses run from one to three months, although some require as much as a year away from the job.

Too many companies have been caught unprepared and forced into hasty emergency selections when an important vacancy suddenly arose due to illness, resignation, retirement, transfer or promotion. Those companies who have carried on adequate executive training programs are much more likely to be found prepared, and should have little or no difficulty in picking the right man almost immediately to fill the created vacancy.

Some companies, such as McCormick and Co., base their plans for upgrading management men on "junior boards". These boards may include a junior board of directors reporting to the senior board, a factory board, a sales board, and others, all very interestingly described in *Business Week* for June 11th, 1949.

Standard Oil (NJ)'s talent search to beat executive shortage as described in *Business Week*, December 10th, 1949, has received wide publicity as has Minnesota Mining's "Delegation of Authority" setup in the September 24, 1949, issue of the same magazine. And there are a great many more.

Chapin Tyler of duPont has made his own personal study of what he thinks are the outstanding characteristics of the best executives he knows, and in the May 1951 issue of

Chemical Engineering Progress, he summarizes his findings. They are so excellent and agree so closely with my own views, that I am going to take the liberty of reading them to you now.

(1) Energy and Drive

"This characteristic is manifest by great capacity for work, coupled with constructive direction of personal effort. One is impressed that such drive is directed at achieving results for the organization rather than primarily for self. Furthemore, this manifestation of energy is infective; it tends to impel or motivate effort in others."

(2) Effective Intelligence

"Because the executive spends so much time working with people, there is a tendency to overlook his role as a thinker. Actually the proper sequence in executive effort is thought followed by action. In spite of the staff assistance which an executive must have, a point is reached in every situation where the executive finds himself alone, figuratively speaking. He must "think the problem through" which means (a) defining the problem, (b) resolving it, and (c) deciding on a practical course of action."

(3) Effective Relationships with People

"From the executive viewpoint, people fall into three groups — superiors, associates, and subordinates. But far from being conscious of rank, the man of executive caliber strives to have equally good working relationships with all three groups. With respect to superiors, he takes orders and accepts constructive criticism without resentment; with respect to associates he is unstintingly collaborative; with respect to subordinates he strives to evoke cooperate effort rather than to impose authority. This last factor is sometimes called leadership ability."

The purpose of executive development and training is to develop more and more men who can qualify under these three important characteristics. In my opinion, if a man has these three traits he has a good chance to go clear to the top. A great deal depends upon the man himself, but a great deal also depends upon management to do its part of the job.

Annual Meeting: Of the Scientific Apparatus Makers Association, to be held at the Greenbrier, White Sulphur Springs, West Virginia, May 24th to 28th. For program, write the Association at 20 North Wacker Drive, Chicago 6, Ill.

Speaker: Florence E. Wall, F.A.I.C., who addressed the Career Conference at Hunter College, New York, N. Y., March 25th, speaking to the Language Group on "The Value of Languages to the Scientist."

The Champion Who Chose to Become A Chemist

Lawrence H. Flett, F.A.I.C.

Former President, The American Institute of Chemists, Inc.

(Introduction of R. Lindley Murray on the occasion of the award of Honorary Membership, AIC, Niagara Falls, February fourth.)

ONE of the most flattering invitations is the invitation to introduce an honor recipient. Medals and scrolls may be declined, but the invitation to introduce a recipient is never declined. The unusual circumstance on this occasion is that an introducer or biographer was never less needed. Lindley Murray has been known to most of you for as many years as he has been known to me. However, when an award is made, it does provide practically the only opportunity there is to talk about the one who receives it. So we can talk about the man who is to receive the Fifty-third Honorary Membership awarded by THE AMERICAN INSTITUTE OF CHEMISTS since it was founded thirty years ago.

One night while I was visiting a fellow volunteer fireman and fellow chemist, he extracted from a group of very precious souvenirs a photograph of the National Tennis Championship in Forest Hills in 1917. Although the picture was small, there was no difficulty in recognizing the typical stance of Bill Tilden, and there was also no difficulty in recognizing the energetic young man from the Niagara Frontier who was to win the match and with it the National Tennis Championship.

When people watch games, they are unconsciously drawn to favor one side. On that particular day, my friend's attachment and admiration for Lindley Murray was well-rewarded. This unusual ability to so easily establish friendships that prove to be life-long has always been an outstanding characteristic of Lindley Murray, and he is the first to recognize the part that these friends and friendly associates have played in his successful accomplishments.

Back in 1918, there was a common feeling among those who knew tennis that Lindley Murray could have been a champion of champions had he chosen to devote his life to tennis. Tennis beckoned with a very brilliant future: a game that the players loved, thrilling matches, parties, and headlines in the paper almost by the day. In spite of such glamorous appeal, Lindley Murray chose to be a chemist — not a very special chemist at that time but a chemist who had, what all young chemists have ever had, the possibility of a creative

future. This much is now certain, Lindley Murray has had far more influence on the history of this industrial civilization in which we live than he could ever have had as a well-publicized figure in the field of sports; but he did carry into his chemistry a recognition of the necessity of teamwork, cooperation and fair play which characterizes fine American sportsmanship. While Lindley Murray didn't make the same headlines as a chemist, we did read in the papers about the Schoellkopf Medalist of 1949 and the new president of the Hooker Electrochemical Company.

It is not hard to understand why people, like Lindley Murray, interest themselves in chemistry and chemists. This is an interest which originates in the heart. It does not come from any expectation of reward. There is no laurel wreath. It is almost beyond imagination that people like our recipient tonight find the time to work so unceasingly and so unselfishly for their fellow chemists. I have seen him arrive at the Advisory Board meeting of *Chemical & Engineering News* and *Industrial & Engineering Chemistry*, when I know it was at great sacrifice; but if he could help with the publications, this is one of the things he would do. When the INSTITUTE has called on him, he has responded wholeheartedly. The American Chemical Society, the Society of Chemical Industry, the American Institute of Chemical Engineers, the Chemical Market Research Association, the Electrochemical Society and other organizations, where chemists work together to help each other, have profited from Lindley Murray's participation. The INSTITUTE recognizes these contributions which help the chemist.

The INSTITUTE is indebted to Lindley Murray for his straightforward, thoughtful presentation when he served as a member of Earl Whitford's panel during the Annual Meeting the AIC held at Niagara Falls in May of 1951. It was a frank and sincere presentation that every young chemist should have heard.

As the president of the Hooker Electrochemical Company, he has recognized a very serious responsibility to his country and to the chemical industry. The financial experts of Buffalo rate him as the very successful head of a fine organization. The papers carry reports of his desire to build a strong research organization at Niagara Falls. This will be a fine service to the community as well as to his company. His understanding of chemists originates in his own successful application of chemistry, both as a research director and as an executive. His unselfish contributions to the solution of professional problems have marked him as one of the leaders of our profession.

In introducing Robert Lindley Murray in this way, I would be remise if I did not point out his origin

in California, because he seems to have brought much of the freshness of the West to the eastern chemical industry. Mention should also be made of Palo Alto and particularly Stanford University, where he carried on graduate studies, where his father was for many years head of the Classical Department, and where he was elected to Sigma Xi and Phi Beta Kappa. It is important to know that his mother came from historical New Bedford in Massachusetts.

It seems to me that the brief time when he worked in a sugar refinery should be mentioned also.

Since September 1916, he has been in Niagara Falls with the Hooker Electrochemical Company. His genius as a research director and later his skill as an executive have played no small part in advancing Hooker Electrochemical Company to its present fine position and in maintaining its fine reputation. These things are all important, indeed very important. At a meeting such as this, however, these material things are laid aside for the moment while here among friends Lindley Murray receives recognition for those things which he has done for chemists.

Lindley Murray is a four-square true American, who left the gilded paths of glory to follow this chemical profession. He is the champion who became a chemist. I think all chemists will understand why and honor him for proving that he chose well.

Presentation of Honorary Membership to R. Lindley Murray

Dr. Lincoln T. Work, F.A.I.C.

President, The American Institute of Chemists, Inc.

**"Not what we get, but what we give
Measures the worth of the lives we live."**

THE AMERICAN INSTITUTE OF CHEMISTS,* founded for and dedicated to the profession of chemist, serves in many ways to give dignity and stature to those men and women who are devoting their working efforts in the science or applications of chemistry. In this, my first official visit with the Niagara Chapter, I find an executive group ready to give freely in this service. They have taken time from their busy day to talk over INSTITUTE affairs in considerable detail. In this meeting, my part must be a brief one; but I would like to tell you something of what we are trying to do:

1. Education of the chemist.
2. Adaptation of the chemist to professional career and society.
3. Personal advancements and placements.

—C&EN

Dr. Work, Lothar A. Sontag, Chairman of the Niagara AIC Chapter, and Mr. Murray.

4. Knowledge of technical trends.
5. Manpower in industry, in teaching, and in government (both civilian and military).
6. Legislation affecting chemists.
7. Patent law.

One of the fine pieces of work done by the AIC was done through the Chemists' Unemployment Committee, in New York, N. Y., during the depression, by your own Chapter member, M. R. Bhagwat, F.A.I.C. He helped the individual chemist, not only officially through the Committee, but by personal sacrifice as the case needed. He revived courage; supervised the activities leading to successful application for positions; assisted the chemist to change his mental attitude; provided friendly counsel, dinners, and even the suit of clothes that was needed to lift the spirit of the discouraged and start him on the way to ultimate success.

The membership of the AIC is around 2500. It should be much more. The possibility for personal service at the local level can be beneficial to every chemist. The Chapters are the strength of the INSTITUTE and the INSTITUTE is pledged to assist the Chapters in every way pos-

sible to make their service to the members more effective.

Not the least, and certainly not its chief activity, lies in the awards of THE AMERICAN INSTITUTE OF CHEMISTS—the recognition of work well done. To those who serve, whether in high place or low, life has its lonely moments, when one craves acknowledgement of the value of his services. Whether in student awards, in the recognitions of the Chapter honor awards, in the great national honors, such as that this evening, it is an opportunity for us to give of ourselves to these recognitions of worth. It seems to me that those who are cynical and who scoff lack something of the understanding of the world in which we live and the deeper, finer sensibilities of human dignity that are attributes of one who is mature.

It has been a rare privilege to preside at three Honorary Membership awards, to Glenn T. Seaborg, Sidney D. Kirkpatrick, and R. Lindley Murray; the teacher and scientist, the editor, and the industrial leader. These are men who have given freely of themselves in their service to their fellow man. As Honorary members they will hold a high place in our hearts. The profession is the better for having the world know that they have received the acclaim of their fellows.

The citation to Mr. Murray reads:

R. Lindley Murray

Outstanding leader in research and development in the chemical industry, who has devoted his lifetime to skillful and sympathetic human relations with his professional associates, particularly in the line of training and guidance of younger men, who with him have made outstanding contributions to the chemical industry.

Prayer

Rev. Joseph B. Muenzen S.J., F.A.I.C.

(Delivered at the Honorary Membership Award dinner to Mr. Murray)

O God, our Father, infinitely wise Designer of this universe, bless us, we pray. Bless us in our fervent endeavours to resolve the mysterious and intricate harmony with which Thou hast fashioned the world of nature. Bless us with that encouraging measure of success in our research by which a deeper insight may bring us to better know and love Thee and promote within our hearts a spirit of greater service and tolerance towards our fellow-man. And, as Thou hast blessed us in him whom we honor on this occasion, we thank Thee and make bold to ask Thy continued guidance and inspiration. Amen.

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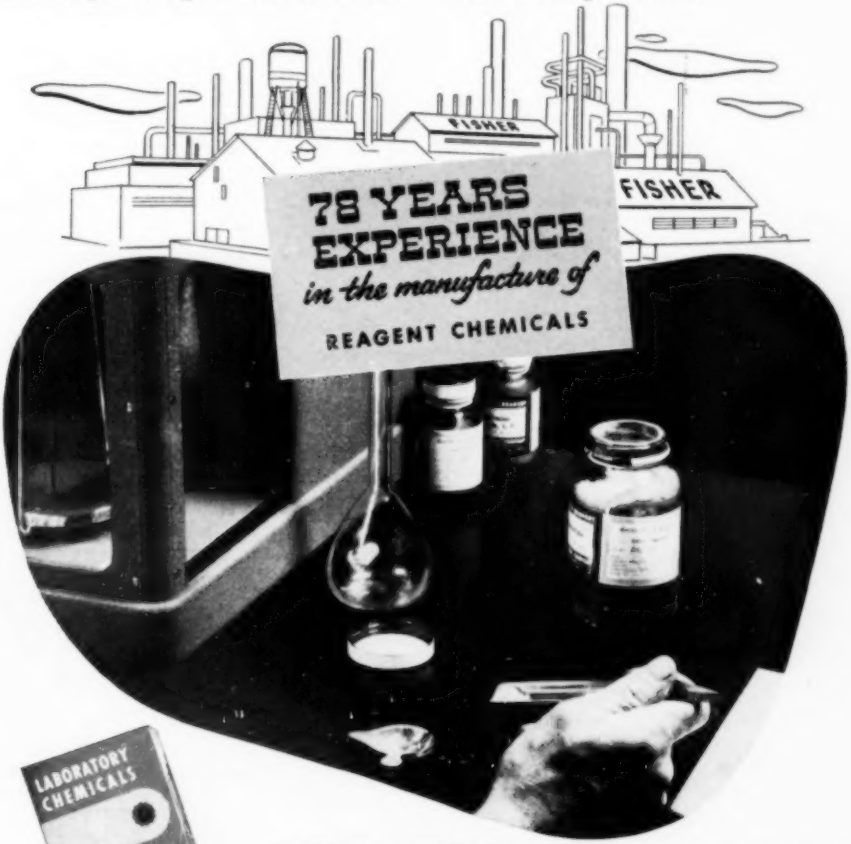

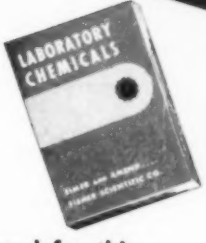

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Program Chairman: T. H. Hopper F.A.I.C., of the 44th Annual Meeting of the American Oil Chemists' Society, to be held at the Roosevelt Hotel, May 4th to 6th, in New Orleans, La. He is connected with the Southern Regional Research Laboratory.

Approved: The principal terms of a merger of Merck & Co., Inc., of Rahway, N. J., and Sharp & Dohme, Inc., of Philadelphia, Pa., by the boards of directors of both companies for submission to stockholders, not later than May fifth.

Fire Training School: Classes are scheduled for May 25-27, June 8-10, June 15-17, June 29-July 1, July 27-29, Aug. 17-19, Aug. 24-26, Sept. 14-16, and Sept. 21-23, by the Ansul Chemical Company on its test field at Marinette, Wisconsin.

Meetings: Of the Electrochemical Society, Inc., 235 W. 102nd St., New York 25, N. Y.: September 13-16th, Ocean Terrace Hotel, Wrightsville Beach, North Carolina. Sessions on corrosion, electrodeposition, and battery. May 2-6, 1954. La Salle Hotel, Chicago, Ill.

New Grants: Three, approved recently to Purdue University by Eli Lilly and Company, pharmaceutical manufacturer of Indianapolis.

Philosophy And Objectives of Research in Industry

Dr. M. L. Crossley, Hon. AIC

Past-President, The American Institute of Chemists

INDUSTRIAL research embraces many widely different activities. For the most part, these activities have a common goal; to obtain a result never achieved before. It matters not whether the search be for the elixir of Life, or for a better means of transforming the potential energy of coal into power and light or for making a better piston ring, if it is guided by the spirit of research. Hyatt, seeking the solution of the problem of producing a good billiard ball; Bessemer, trying to find a way to make steel from cast iron; Goodyear, endeavoring to transform the sticky matter from the rubber tree into something useful and Perkin, wrestling with the problem of synthesizing quinine, employed the means of organized experimentation to secure their aims. The desire to know and the will to try determined their efforts. Unusual capacity to understand the significance of the phenomena they observed was an important factor in determining their success. The dominant factors of research were manifested in the work of these investigators though their preparation for such work was markedly different.

All true research employs the same methods and is governed by the same principles. However, there is considerable variation in the purpose and scope of research. This has made it desirable to recognize different kinds of research and to have some useful classification of them. Unfortunately there is no commonly accepted classification, because the distinguishing characteristics of the individual types are not sharply defined. The distinctions are, to a considerable degree, arbitrary. It has been the custom of some to speak of "pure research" and "applied research"; of others, "pure research" and "industrial research" and still others use the terms "fundamental" and "applied" to distinguish between what they consider to be the two major types of research. None of these terms adequately distinguish the different kinds of research. By pure research one usually means that undefiled by any practical aims. Its major purpose is to increase knowledge. This is a desirable aim. However, too often it is conducted wholly to increase information in a specialized field without any desire or obligation to try to understand its significance in relation to the body of existing knowledge. Masses of uncorrelated information pile up without adding much to the sum of knowledge in the

field. Of course, there is a lot of worthwhile research done under the banner of pure research, but there is also considerable time wasted because of the mistaken idea that there is an unreconcilable conflict between original thinking and purposeful endeavor. So called pure research may be broad and fundamental or it may be highly specialized product research. Likewise appplied research may often embrace some of the most fundamental types of work. Industrial research, today, embraces every kind of research that may lead quickest to a desired result. It is true that it is purposeful but it is none the less real and scientific.

The Categories of Research

For convenience we may consider research to fall into five categories. I. Exploratory research, work that opens up leads and theoretical possibilities and is usually undertaken without any practical objectives in view; II. Fundamental research or that intended to establish the principles for an understanding of the problem and an appreciation of what should be done to solve it; III. Product research, for want of a better term, or that type of research involved in the creation of new products and things, including the best means of getting them; IV. Development research or that work needed to translate laboratory techniques and results into industrial "know-how" or commercial processes and V. Technical research to extend the usefulness of available products and things and to ascertain the potential need for others not known at the time. This latter type of research must also lay down the patterns of the desired types of products and things to meet the future need. All of these different kinds of research have overlapping elements. Only the last two are to be wholly excluded from the realm of pure research and assigned to the humble role of industrial service. The other types may or may not be undertaken with a practical objective. Whatever the type of research, industry must have the best and most complete knowledge it is capable of securing to render efficient and excellent service.

Not all that goes under the name of research in industry is really research. Some of it is just plain pot-boiling or routine experimentation. There should be no difficulty in distinguishing between routine experimentation and research. The former uses precise and formulated information as a tool to produce known results which can be reproduced over and over. It has no concern with the acquiring of new knowledge. It is imperative that it does not vary its procedure if it is to reproduce its results. The latter seeks new facts and in the search for them must employ new procedures and new ideas. It must evaluate the old and the new evidence and fit what is significant

of each into a composite picture that can be realized. In industrial research it is important that the result be had in the shortest possible time and at a reasonable cost. It is not enough to obtain new and interesting facts; one must also strive to get worth while results.

Research must be measured by what it accomplishes as well as by how it is done. However, the results of industrial research are not always measurable in terms of dollars, although the dollar sign is the common indicator of its success. It has been stated that the American public saves about four billion dollars a year in its light bills because of the research done to improve lighting. This does not represent the entire benefit derived from the research in this field. There is no proper measure of the full import of the advances in electric lighting on the course of civilization. It is easy to determine the amount of usable energy obtainable from a pound of coal and to compare this with that delivered by the work of a horse in an hour, but, it is an entirely different matter to evaluate what it means to society to be able to transform the energy of coal into electricity and this into light which can be controlled and used at will. The sales' value of drugs, dyes, perfumes, resins, rubber and textiles can be stated in dollars, but no one has found a satisfactory way of estimating the value of the relief from pain and suffering or the importance of the well-being which results from having the good things of life. These are largely the products of research.

In this country the tempo of industrial research as well as other research has been greatly accelerated during the last three decades. Particularly is this true in organic chemistry. Prior to 1916 we had few industries employing organic chemists for research work. The bulk of this type of research was confined to the Universities. This was also true of biochemical research. Good work was done in the metallurgical and in the electrochemical industries but the number of people engaged in research in these fields was small. Our people

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Research is Creative Work

In a large degree, research is creative work and requires those who serve in the field to possess the special attributes that are essential for creative ability; an insatiable desire to know, a disciplined imagination and originality, or, that quality of mind compelling one to seek new frames of reference into which to fit new experiences .These cannot be wholly acquired. When found, they must be cultivated by proper education and experience to produce able investigators. The problems of research are usually complex, involving interwoven strands of different phenomena. To unravel these is of the utmost importance in life. The role of the research investigator is that of the architect of human progress responsible for the design to which the ultimate structure is fashioned.

The basic training for research must be sound and broad enough to fit one to think wisely and work effectively. This requires more than a broad proficiency of knowledge and special expertness, though these are essential. In addition, one must be capable of being inspired by the potentialities in his work. He must be able to catch the vision that lies far beyond the exacting details of work and be fired by it with enthusiasm and ambition to succeed. This is essential if he is to soar to the lofty heights where only the most sublime and rare thoughts dwell. It is only when one reaches up to the highest peaks of endeavor, determined to face obstacles that he has a chance for success. Such heights are not reached without a struggle requiring great endurance and perseverance to win. Every success comes through a Gethsemane of trial.

The will to succeed is of prime importance. It is born of ideals and nurtured by inspiration. The smoldering embers of the desire to succeed must be constantly fanned into a conflagration of enthusiastic effort by inspiring leadership. The capacity to be inspired is a prime requisite for original thought and sustained effort, both highly essential in research. That it is not always possessed in high degree by those selected to do research work is a matter of great regret and of utmost importance to the future of research. Wherever found, in whatever degree, it must be cherished and cultivated to develop its maximum possibilities. It is a function of good leadership in the direction of research to inspire men to great accomplishments.

Such inspiring leadership helps men to rise above their limitations and achieve a measure of success far beyond their ordinary power of accomplishment, based on their indicated capacities and potentialities. Of course good leadership must be inspirational if it is to fulfill its obligations. Men must be inspired to want to make the best possible impress on Life. They

must be aroused to that degree of effort which alone can sustain the fires of ambition essential to the development of their highest capacity for service. Without this, human capacity for service sinks to a low order of efficiency in which imagination and skill are wasted talents. Men must be encouraged to want to find out the meaning of the facts they obtain. They must not stop with having found out what things are and how they came about but must keep pressing forward in the search to find out why. They must rise above the limiting influence of the commonplaces in daily experiences to see the proper significance of facts and be able to interpret them wisely. Inspiring leadership must keep men marching forward enthusiastically toward the goal of high accomplishment in spite of numerous difficulties and discouragement. Interest must be sustained at all costs.

Individual Effort

Facts alone do not have the power to sustain interest and compel loyal devotion to the ideal of individual excellence in research. Individual excellence is most essential to group effort and to team morale. It requires the inspirational element in human relationships to light the fires of enthusiasm and keep them burning before the alters erected to high ideals. It is only by this means that the average research man becomes more than a disinterested individual, working out a life sentence in a job. As the architect of human progress he should be able to understand the significance of the changes he would bring about with the results of his research. In his exploration of the core of the atom and the nucleus of the gene he must be guided by the compass of human betterment. His course must be taken from the best available experience charts.

The ability to evaluate facts and interpret their significance in relation to the problem under investigation is best developed by a broad knowledge of the circumstances surrounding the facts and a sympathetic understanding of the limitations of human observations and judgments. The capacity to realize the significance of results and to appreciate their importance does not come merely from the accumulation of technical information. One must do more than store facts in his mental attic for safekeeping, if he would be more

than a repository of unassorted mental rubbish. He must constantly examine the facts in his possession and select those that are useful at the time in his thought processes for giving the most satisfactory design of what he would accomplish. He must examine each fact in the light of new experience, and have the courage to reject what the evidence shows to be obsolete or false at the time. At some other time these discarded facts may prove to have greater significance and usefulness. With equal courage they should be re-examined and now fitted into the mental picture. In the process of thinking, the constant purging of the useless information is just as essential to normal mental growth and activity as is the elimination of metabolic wastes to body development and well-being. Assimilation without elimination leads, in both cases, to perverted functions.

Education and training must develop in the research investigator the capacity for rapidly gauging the relative worth of facts and ideas. This process of sorting must go on continuously to avoid the mental accumulation of obsolete ideas becoming obstacles to research progress. This they will be when they are treated as possessions of permanent value to be stored for occasional inspection and again returned without change to the mental treasure vaults where they may be guarded against the possibility of loss. This use of ideas is not thinking, it is simply playing with antique mental toys.

Facts must be always tempered in the fires of experience to be of value in guiding future progress. The past and the present are but two phases of the same continuity. The elastic force uniting the past and the present derives its binding quality and power from the devotion to the ideals which sustain human effort and enrich life.

The power of ideals in shaping man's judgment and in intensifying his purpose is manifested in disciplined thinking and efficient service. It is this power which enables men to rise above defeat and discouragement, pressing on to the goal of high accomplishment in the struggle for human betterment.

To Dream is Essential

What one does in research is determined by what he is prepared to see and believe possible of achievement. No artist paints a picture which he has not previously fashioned in his mind. Likewise, every product of research must be clearly outlined in the mind before it can become a reality. The investigator must penetrate beyond the boundaries of the known to obtain a vision of that which he would create and then will to make this a reality. The picture he sees can be no greater than his capacity to visualize it. To dream is essential; to make the dream come true is imperative in industrial research.

The realization of research dreams

in industry is dependent upon the conditions under which research is organized and directed. Scientific ideas must have an atmosphere of intellectual freedom for development. They cannot take root in the soil of collectivism, fertilized by regimentation and cultivated by force. Neither can they germinate and develop in a nonscientific environment controlled by factory management. Research contributes most to industrial progress when it is recognized as an important factor and organized to function with independence and dignity.

The important problems are to recognize the early industrial potentialities of the dreams that come true and to know when to stop thinking and working on those that seem hopeless or impractical. Unfortunately there are no sure signs to guide us in making a decision. The judgment that is correct and wise now may not be so at some other time. Some human need to be satisfied or an economic advantage to be gained in the application of the new knowledge help to formulate the decision. It is also true that many good and potentially valuable results of research depend for their acceptance and development on the conditions of the times. Sometimes it seems impossible to get new products and things accepted and appreciated at the time they are produced. There are several reasons for this. It often takes time to demonstrate that a new product has the capacity to fill

a known need in industry. Besides, not all the knowledge may be available for the complete understanding of the service the product is capable of rendering. The value of the product may not be recognized until new developments in quite different fields create a demand for it. The need for the product or the things which could be made from it may not be recognized at the time. Also the conditions that would justify its development may not be right at the time the product is discovered. Finally, the fundamental data required to establish the connecting links in the chain of knowledge essential to a proper understanding of the problem may be missing and it may not be the opportune time to secure the desired information. The proper timing of research is an important problem and should receive adequate attention in the programing of work.

At the proper time industrial research must recognize what of its results have significance and find out how best to organize the knowledge and formulate it into a workable,

useful, technological tool, capable of being operated by non-technical men at maximum productive capacity. This can not always be done best by the investigator himself. It is usually the product of the efficient integration of several types of service welded into a composite productive unit of precise knowledge or know-how. This is an important factor in industry. However, it will not alone produce the goods and service of this industrial age. Science, technology, finance and management united by the tie-rods of a high sense of human values are required to make effective the results of research in industry.

The Position of Research

The contribution of research is real and should be accorded proper recognition in the productive power of the industry. It must not be regarded as a burden on the body politic of industry when it is the creative force responsible for industry's very existence. As one of the factors determining the earning power it should be treated as an important asset and allowed to share in the success of the production it makes possible.

The contribution that research makes to industrial progress is measured by the judgment shown in selecting problems for investigation, and by the excellence of the work done to solve them. The nature of research problems varies widely with the type of industry and the state of its development. There is no universal standard to guide in the selection of worthwhile research problems. The scope of the activities of the industry and its future goal determine the program of research. There are always more problems to solve than can or should be investigated. First, it is important to make sure, as far as is reasonably possible, that the apparent problem is real. Then, is it worth solving in relation to other problems that are pressing for solution and should it be undertaken at the time? There is no way that I know to be certain of the correct answers to these questions. The best that can be done is to evaluate the evidence in each case with boldness and courage, using the best judgment one is capable of in making decisions. Whatever the decision, it should be prompt and free from prejudice. Inefficiency in research results more often from unwillingness to make decisions than from wrong decisions. When one knows that he has all available pertinent facts he should correlate them and determine their bearing on the problem, making the decision which he believes the evidence to justify at the time. He must not confuse the issue by speculating what his decision would be were the facts different. If new evidence proves the decision wrong, then change it in the light of the state of knowledge at the time. This should be done fearlessly and cheerfully.

The Selection of Research Projects

In the selection of problems for investigation one must always resist the temptation to fall into the habit of doing only what happens to be popular or fashionable at the time. Not all of the worthwhile things to be accomplished are capable of popular appeal, at least at the time of undertaking the investigation. Research too often suffers from the common tendency to follow the leader. Though there are abundant new frontiers to be crossed, the most attractive one appears to be that which others are streaming across. There are many reasons why this is so, but, one of the most impelling is the curiosity to know, not only what the other fellow saw along the trails, but, also, what he missed. It is vision to recognize what others failed to see, but, this leads to no useful good, unless it is properly interpreted and fitted into the picture that gives a satisfactory result.

The Importance of Observation

To observe correctly is essential to effective research. The research investigator must not only possess an unusual keenness of perception but he must also have a highly developed sense of values. We see usually what we wish to see and we appreciate the significance of what we observe only to the extent of our interest. The value of experience in research is dependent upon accurate observations and the completeness and exactness with which they are recorded. Interest in the phenomena observed is fed by curiosity to know. This insatiable desire to know is the driving force of research. It must be possessed to a high degree by all who do creative work. But, just to be curious is not enough. Curiosity must be disciplined to be of value in seeking truth. It has to be supported by courage to follow the trail to the end, in spite of discouragement, without faltering.

Good observation is too often marred by faulty methods of recording what has been observed. It is essential that the experimental evidence be recorded without prejudice. This is possible only when the observed facts are recorded at once and without comment. The longer one waits to record what he has seen the greater the danger of his recording what he remembers of what he saw and this is usually colored by what he wished to observe. So much of the experimental data of research is a hash of what the investigator hoped to get and what he did get that it is difficult to know what credibility to give to

the evidence in evaluating the results. It is imperative that evidence be free from these defects if research is to be productive. The research man must be trained to obtain evidence without prejudice and to record it in a concise and orderly manner. This is true with the information from the literature as well as that from his own experimental work. When several people are involved in interpreting the evidence, the one who secures it has an added responsibility for seeing that it represents all the facts and nothing but the facts. Since the most effective work in industrial research is done by teams of men, it is imperative that the evidence the team has to base its plan of investigation on should be complete and exact. The correlation and evaluation should be done by all together after each member of the team has had time to study the evidence.

The plan should be based on a thorough consideration of all the evidence. It should be comprehensive but flexible. It must give each contributor a chance to bring to bear all of his knowledge and experience without regimenting those who put the plan into effect. This is by no means easy. It calls for a high degree of tolerance for the ideas of others, absolute mental honesty in dealing with problems and men, a fair appraisal of personalities, and a genuine desire to reach an understanding by compromise. Evidence that is tainted by prejudice is usually the stumbling block to progress in team research. A broad knowledge of facts outside of the narrow field of specialized research best qualifies men to be tolerant of the views of others. A willingness to accept facts that do not please; that upset one's mental equilibrium and compel a readjustment of pet ideas, often requiring a complete revision of habits of thought, is not a common endowment of mankind. It is, in fact, one of the rarest of virtues. When found it should be cultivated with painstaking care.

Teamwork

Teamwork is absolutely essential to rapid and efficient service in industrial research. Proficiency and expertness in different lines must be brought to bear in the attack of a research problem. No one person can ever be expert enough in all phases of the work to be done to solve the problem to complete its solution in a reasonable period of time. Proper cooperation between specialists is the best assurance of success. In industrial research this cooperation is had to a fair degree. The future of industrial research demands that we learn how to obtain it fully. The problems in chemotherapy, particularly, challenge the spirit of cooperation of research men. Only by the full cooperative effort of biologists, chemists, physicists and physicians is there hope of solving the cancer problem. Industrial research is a race that should be

run by an organized, well-trained, relay team and not by individuals competing over the same course with the vain purpose of beating one another to the tape. This sort of a race usually results in a dead heat.

One of the major difficulties in team research is to get men of outstanding ability and originality to work together harmoniously. It is essential that the men in the organizations who have the most proficient and expert knowledge in the branches of science and technology involved in the solution of the problem should be the team to study it. It is imperative they analyze the problem together, each using his specialized knowledge to probe into its unknown compositions. The results should be, there and then, compared and made the basis of an outline of the plan to follow in trying to solve the problem. Each member of the team assumes the responsibility for the execution of his part of the problem, with full recognition of his obligations to the team and with a deep conviction that his efforts are greatly strengthened by the cooperation. The success of such teamwork depends upon the complete suppression of personalities and selfish interests. Playing to the gallery or seeking the lime-light by hogging credit for results, is the most frequent cause of failure in team research. This is further aggravated by the same individuals assuming that they have been responsible for all the good ideas of the team but never for the bad ones. Generally they are the members of the team who are inarticulate in conference, afraid to express what thoughts they have when preparing the attack on the problem, but who become voluble as soon as any good results are obtained. They are trouble makers and should be dropped from the team. The men who dare to express new thoughts, even when they appear to be in conflict with accepted views and theories, are the ones who contribute most to team results in research.

These men have originality and this accepts no limitations on thinking imposed by authority. It seeks new frames of reference into which to fit new experiences and learns new truths. The research man who is a slave to authority is a hindrance to progress. He always stresses the difficulties and finds reasons for not doing rather than for doing. His attitude is to accept the dictum that it can't be done and then seek to bolster his position by faulty application of laws and theories which he does not fully understand. One reason for this is

that in his education he accepted the skeletons of the theories and lost their substance. The original type of mind tries to find how to do things instead of reasons why they can't be done. Of course, it is much easier to convince oneself that it can't be done than it is to do the work that will insure success in the doing of it. The worthwhile accomplishments in life result from the determination to examine into the validity of the evidence and not be satisfied to accept blindly all that is said to be true.

All about us is abundant evidence of things happening that we do not understand. Living organisms take comparatively simple substances and build them into complex compounds by reactions that take place at relatively low temperatures and under atmospheric pressure. There are no vital laws that limit these reactions to living matter. We will duplicate these and produce similar ones, having no counterpart in nature, when we learn more about the types of catalysts involved and understand the mechanisms by which the reactions take place; in other words, when we know more about the how and why of the reactions involved in natural processes.

The Main Objectives of Research

The objectives of industrial research can be reached best through cooperative effort. Both the formulation and realization of the objectives involve different types of training and experience. In general the industry must be capable of looking ahead to see what will be needed to meet the demands of industrial progress before these demands become obvious. Also, it is essential to the proper growth of industry to find outlets for by-products. It is only by doing so that a healthy industrial metabolism can be established and maintained. Besides, the main products of present day manufacture may be ancient relics in the near future unless research keeps constantly on the alert to find new uses for them.

Research has four main objectives in industry. It must provide new and useful products and processes which technology can assemble into agencies capable of shaping human advancement; creating these new products and things so as to assure industry of new earning power and of providing the means for social and economic progress. It must obtain fundamental data essential to the understanding of problems and necessary to guide in their solution. It must maintain the quality and efficiency of the products and the services they render in order to safeguard the existing investment in the industry. And finally, it must furnish the basis for the production of the variety of types of products needed to maintain the essential structure of a free competitive system of economy. All of these are essential, although not in the same way or to

the same degree. The first assures the continued progress of the industry; the second is the stimulating hormone which controls the growth processes of industry; the third protects the developing structure from the dry rot of complacency; and the fourth is the essential catalyst for free enterprise. Not one could we do without if industry is to have the means for rendering better service tomorrow than it is capable of giving today.

This is progress. It can't be had for nothing. Every good comes from the expenditure of extraordinary human effort and money. It is always a question of what price we are willing to pay for progress. This can be answered intelligently only when we know what we get for what we spend. It is human nature to take the good things in life for granted after they become readily available. Yet, reflection shows that they could not have been realized without the expenditure of large sums of money for research, development, production and distribution. Also, many different types of service contribute to the successful result. To have automobiles at prices within the economic reach of the average person in this country large amounts of money have been spent for research on petroleum to make possible abundant, cheap gasoline. Considerable metallurgical, and engineering research, coupled with technological development, at considerable cost were necessary for efficient and cheap production of the machines. These machines would not give pleasurable and constant service without the contributions from chemical and physical research in the development of accelerators and antioxidants needed to produce tires which give the automobile owner more than four hundred percent increase in mileage and better service at a cost which is only a fraction of that of the previous poorer tires. Likewise, the synthetic products that enable the consumer to have all the colors of the rainbow, that give him the means of duplicating the delicate perfume of the rose, that enable him to gratify his desire for silks and satins without the aid of the silkworm, that provide means of satisfying the demands of beauty without the bounty of Nature and provide chemical bullets, in the form of drugs, to stop the invasion of microbes, thus minimizing the hazards of disease and staying the sickle of death; all these, and more, result from costly

research. None would be available without there being profits in industry. The important question is: Who profits most by research in industry? The obvious answer is: the consumer of goods and service. He is the chief beneficiary of industrial as well as academic research. This is a product of free enterprise and the competitive system of business. It is an essential cornerstone in the social edifice which assures human freedom.

To obtain the objectives of research in industry efficient organization is necessary. If there is one type of organization best for industrial research I do not know it. Conditions determine the effectiveness of each type of organization. The important problem is to see that there is the maximum capacity for smooth and efficient cooperation between the several units. There should always be the closest relationship between the several types of research. This can best be accomplished by having the several divisions of work correlated by the same organization. The technical experience in developing processes for commercial use conditions, on the one hand, the research laboratory to an appreciation of the practical elements involved and on the other hand lifts the development work out of the realm of routine. The research man becomes inocculated with the virus of practicability without becoming immunized against creative thought. The development chemist is likewise conditioned to do better and broader thinking in connection with his problems. Besides, there is no sharp line of distinction between research and development. When the two are conducted by different organizations, the major problem is to avoid wasteful duplication of effort and delay due to friction and misunderstanding. Whatever the type of organization, good leadership must keep ever burning the light of unselfish service, so as to enable the organization to serve with the greatest usefulness and distinction in providing for the fullness of life that will enhance the rate of human progress. It is equally important that the results of industrial research should enrich and ennoble the life of all mankind.

New Position: V. N. Morris, F.A.I.C., is now executive secretary of the Council of Research Directors of the associated Johnson & Johnson companies, New Brunswick, N. J. He was formerly director of research for Shellmar Products Corporation.

Graduate Fellowships: Made available by Coats & Clark, Inc., for study and research in the field of textile technology at the Massachusetts Institute of Technology. Send inquiries to Dean of the Graduate School, Massachusets Institute of Technology, Cambridge, Mass.

Why Public Relations for Chemists?

Robert L. Taylor, F.A.I.C.

Vice President, Hill and Knowlton, Inc., 350 Fifth Avenue, New York, N. Y.

(Presented before the "Symposium on Public Relations for Chemists" of the New York chapters of the American Chemical Society and the American Institute of Chemists, Hotel Commodore, New York, N. Y., January 15, 1953.)

IF THERE is one characteristic of modern society that distinguishes it from that of a hundred years ago, it is the degree to which almost everything we have and do depends on others.

In the field of science, the private investigator, the chemist or physicist working alone amidst his apparatus in a secluded laboratory, is largely a thing of the past. Research today is carried out by teams of scientists, working together. And although that celebrated "flash of genius" which is said to be the hallmark of true invention can spring only from an individual and not a collective mind, the fortunate possessor of such a mind, if he will look around him, is almost sure to find himself startlingly dependent on others for many of the ingredients of his success.

This is the situation that exists today in most fields of human endeavor, and there are many of us — chemists and non-chemists — whose natural inclination is to rebel. We dislike being dependent. We subconsciously long for the days when man was "master of his fate and captain of his soul." We would like to think of ourselves — especially if we are professional people — as independent and free.

Sometimes, however, I wonder if this feeling in some of us isn't a little like that of a friend of my father's in Detroit. The man was an automotive engineer, and he was concerned with the design of automobile bodies. "If it weren't for the confounded weather," I remember him saying, "designing auto bodies would be easy."

Unfortunately, man must contend with "weather" in one form or another in almost everything he does. For better or for worse, a large part of the "weather" each of us comes up against in his work and his daily living is determined by people — people on research teams, people in companies, people in towns, people in nations. People determine the climate in which individuals and institutions must live and operate today.

Public relations is simply dealing with people. It is human relations on a broader scale. It attempts to make this public climate in which we must work a little more congenial so we

can get on more easily and speedily with our real job, which may be designing automobiles, or making chemicals, or just making a living.

In thinking about why anyone needs public relations, a good starting point is to think specifically about which groups of people — which publics — are of most importance. In other words, who are the weather-makers?

In the case of the chemist, I believe there are three that stand out: first, his fellow workers, and in this category I include the boss, for if a chemist is unwilling to consider his boss as a fellow worker I believe he should either examine his own thinking or get another boss; second, the public in general; and third, government.

Much has been written and said on the importance of getting along with other people as individuals, which is what we really mean when we talk about better relations with our fellow workers. And, strangely in view of all the present-day emphasis that is being given to human relations, the subject has been a very popular one for quite a number of years. Back in the 'twenties, the University of Chicago and the United Y.M.C.A. Schools conducted a survey to determine what adults wanted to study. The survey cost $25,000 and took two years. After all the answers were tabulated they indicated that health is the prime interest of adults — and their second interest is people: how to understand and get along with people. A man named Dale Carnegie helped make that survey, and he has been cashing in on it ever since.

In accepting the 1952 honor award of the Commercial Chemical Development Association, John P. Coe called human relations the "unseen element" in commercial development, and characterized it as "dominating" the three generally recognized elements of research, production and sales. "We must add to our technical and professional expertness an unselfish interest in and, above all, a sympathetic understanding of people," said Mr. Coe, in pointing the way to more effective accomplishment in this field.

Evidence on every side points to an increase, if anything, in dependence on the techniques of group action in scientific and technical work.

The very size and rate of expansion of the body of scientific knowledge promises to force increased compartmentalization of science, and greater restriction of the field of work of the individual scientist. Also, many of the jobs that scientists are being called upon to do—of which meeting the nation's insatiable appetite for material resources is one of the greatest — are the kinds of jobs that one man, or even a small group of men, could not hope to accomplish by themselves.

So it appears that there is every reason for the chemist to concern himself with conscious techniques for bettering his relationships with his fellow scientists. No longer a cloistered manipulator of inanimate things, he is now a member of a working group. And his own accomplishment, recognition, and personal happiness will depend to large degree on how effectively he is able to fit into that group.

It might also be mentioned that ability to deal with people is a very salable commodity in itself. John D. Rockefeller once said, "I will pay more for that ability than for any other under the sun." Not all chemists aspire to administrative posts, but for those who do, a well-developed sense of human relations is a prime requirement.

Earlier I mentioned that I also included the boss as part of the chemist's fellow-worker public. In the professional public relations field we talk and hear a lot about employee relations — how to keep employees enthusiastic members of the company team. I have often wondered why we don't hear more about boss relations. The boss, too, is a person. He responds to the same treatment, and in about the same way, as other people. Yet I wonder how often chemists really try to put themselves in management's shoes and understand management's problems?

Frequent mention is made about management's failure to understand and appreciate the chemist. I am sure there is need for better understanding and appreciation of chemists by management and of the part chemists play in making possible the goods of industry. But I wonder if chemists are doing all they can as individuals — not through their professional socities, but as individuals — to bring that better understand and appreciation about. To what extent is each chemist trying to make himself a real part of the organization for which he works, to see his job not only in terms of his own immediate problems but also in the light of the broader objectives and problems with which management must struggle? Good chemist-management relations require a two-way effort.

Now let us look for a moment at some of the reasons why the chemist should be interested in better relations with the general public.

Despite the fact that chemists have perhaps wrought more widespread changes in the physical world today than the members of any other

profession, the public is still largely ignorant of what chemists do, how they work, and who they are.

I have always liked Boss Kettering's story about the popular conception of research.

Kettering had a friend visiting him from New York, and the friend said, "This research work is the most dramatic thing in the world. I want to get my son into it."

Kettering said, "Do you know how dramatic it is?"

The friend said, "No."

"Well, I'll tell you," said Kettering. "Did you ever see a fly trying to get across a piece of sticky fly paper? That is how dramatic it is. When you pull one foot out, the other is sinking in."

I am afraid the Hollywood conception of research and chemists and chemistry still exists in the minds of many people. Newspapers have been slow to carry stories about the more solid achievements of chemistry because they have found them difficult to understand and to translate into something meaningful to their readers.

Here is where I believe chemists have a real public relations obligation. Public education and enlightenment on the nature of chemicals, their safety, their beneficial contributions to mankind, and their basic importance in our industrial economy and national defense, should be the job of every chemist and chemical organization. The Manufacturing Chemists' Association, THE AMERICAN INSTITUTE OF CHEMISTS, and the American Chemical Society are making headway in that direction, but their efforts are small compared with the potential that lies in the voices of 100,000 chemists across the nation.

Each chemist should seize every opportunity that comes his way to enlighten public audiences on the results and potentialities of new scientific and technological research and development. He should grasp every opportunity to assure people, in his capacity as a member of the chemical profession, that both the profession and the chemical industry are aware of the trust and responsibility placed in them by virtue of the greatly expanded use of chemicals in products consumed by the public.

This duty is one which only chemists themselves can perform completely. It is one to which they must devote more time than they have in the past, as well as more effort to make their presentations lucid, forceful, and appealing.

In addition to public education and enlightenment of the *nature* of his contributions to society, guidance in the *use* that society makes of his work has been proposed frequently as an even more compelling reason for the chemist to speak up loudly and often.

I cannot include this reason on my list. It does not seem to me that the chemist, in his capacity as chemist,

should either be asked or expected to make it his duty to try to influence the government to assure proper, or peaceful, or best, use of his discoveries.

This is not to say, however, that the chemist has no place in politics. Quite the contrary. A group of scientists some years ago properly declared: "No one has the right to withdraw from the world of action at a time when civilization faces its supreme test!"

But this is true not only for scientists but for *all* citizens. And it points to the necessity both of informed political opinion on the part of scientists, and of informed *scientific* opinion on the part of non-scientists, especially statesmen and politicians.

This brings us to the last public that the chemist should be interested in reaching — the government. While chemists should not, as chemists, be held responsible for the uses to which their work is put by government, both government and the public have a right to expect that chemists will take the lead in pointing out to government both the beneficial and the dangerous applications of their discoveries and developments.

Chemists can also assist in helping to educate government officials on the importance of chemicals in securing our national defense. It is easy to see and understand that guns need steel and airplanes need aluminum, but it

is not so clear that no gun can fire and no airplane get off the ground without certain essential chemicals. Neither is it always clear to those who do not know the chemical industry, that you can't get chlorine out of a sulfuric acid plant, or styrene out of an ethanol plant. There is little comprehension in Washington of how the chemical industry operates. Few people in government today have any idea of the extent to which the safety and security of the United States depend on chemicals.

Finally, I believe there is one last reason in particular why chemists should be earnestly concerned with their relations with their government and with their responsibilities as citizens.

The science of chemistry holds the key to the real frontiers of the future, to the great storehouses of new materials that must replenish those now running low, to the achievements that will continue to improve our physical welfare and comfort. The climate provided by government, in which our science and industry must function, will be instrumental in determining the speed with which we will be

able to develop these things and place them at the service of people everywhere. It will be instrumental in determining whether chemists, while they are doing this, will be free men or employees of the State. It will be instrumental in determining whether the new materials will be made in private plants or by government monopoly. These, I submit, are fundamental considerations which should go high on every chemist's list of reasons, "Why Public Relations?"

The Largest Customer: Industry, for scientific instruments, laboratory apparatus and equipment, according to the Scientific Apparatus Makers Association. Compilations show: Industrial customers purchase 50 per cent; educational institutions 23 per cent; federal, state, and local government agencies 12 per cent; hospitals 5.5 per cent; exports 6.5 per cent, and miscellaneous (including sales to other dealers) 3.06 per cent.

In Production: The new plant of E. F. Houghton & Co., Philadelphia, located at 140 Washington St., South, Hopkins, Minn. operated as the Houghton Vix-Syn Co., to manufacture synthetic rubber packings.

New Company: The Allen Engineering Company at 15 Alden St., Cranford, N. J., formed by George B. Allen, to specialize in chemical process equipment.

Chosen: Goodyear Tire & Rubber Company, of Akron, Ohio, as operating contractor for the Atomic Energy Commission's Uranium-235 production plant being built in Pike County, Ohio. When the $1,219,000,000 facility is completed, in about four years, Goodyear will be the principal employer there with a working force of about four-thousand persons. Goodyear has made the following appointments, among others: Manager of operations, Albert J. Gracia; manager of laboratories, James A. Merrill; manager of development engineering, D. H. Francis; manager of production, George H. Reynolds, and in charge of purchasing and materials, I. S. Gharky.

Announced: By Jasper H. Kane, F.A.I.C., director, the promotion of Dr. Ernest M. Weber to associate director of biochemical research and production at Chas. Pfizer & Co., Brooklyn, N. Y.

Planned: By Monsanto Chemical Company, the manufacture of polyethylene plastics. The site for the unit depends on studies of raw material sources and on markets for the plastic.

Featured: In the Paterson, N. J. *Call*, September 5th, consulting laboratories in the modern world, as typified by the laboratories of William J. Schepp, F.A.I.C., at 21-23 Summit Ave., East Paterson, N. J.

COUNCIL

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National Council Meetings

Meetings of the AIC National Council are scheduled to be held at The Chemists' Club, 52 East 41st St., New York, N. Y., at 6:00 p.m., on the following dates:

April 8, 1953

May 11, 1953 (Philadelphia, Pa.)

(See page 172)

March Meeting

The 287th meeting of the National Council was held March 11, 1953, at The Chemists' Club, New York, N. Y. President Lincoln T. Work presided.

These officers and councilors were present: C. C. Concannon, T. R. Donlan, F. A. Hessel, M. J. Kelley, R. H. Kienle, J. H. Nair, D. Price, Foster D. Snell, L. Van Doren, F. E. Wall, and L. T. Work. G. L. Royer and B. Sweedler, Committee chairmen, and V. F. Kimball were present.

The minutes of the preceding meeting were approved.

President Work reported that he had attended the meeting of the Niagara Chapter at which Honorary AIC Membership was presented to R. Lindley Murray, and the meeting of the Pennsylvania Chapter

at which the Honor Scroll of the Chapter was presented to Dr. P. E. Wells.

A preview of plans for the Annual Meeting was presented.

A letter from the Chicago Chapter suggesting fields of activities for the INSTITUTE was presented for discussion. Dr. Royer stated that his Committee on Employer-Employee Relations is working with Dr. Bloch of the Chicago Chapter in its consideration of chemists' contracts.

The Treasurer's report was accepted.

The Secretary announced with deep regret the deaths of the following members: Maurice Dolt, F.A.I.C., Ralph Clare Huston, F.A.I.C., Clare Olin Ewing, F.A.I.C., B. S. Hopkins, F.A.I.C., on August 27, 1952; Arthur D. Robson, F.A.I.C., on December 2, 1952; Jenoe Eugene Tausz, F.A.I.C., on February 19, 1953; W. F. Greenwald, F.A.I.C., on February 27, 1953. The Council observed a moment of silence in tribute to the deceased.

The Secretary reported that Harry Burrell, chairman of the New Jersey Chapter, had been transferred to Cincinnati, and that Dr. James B. Allison, chairman-elect, has assumed the chairmanship of the New Jersey Chapter.

Mr. Nair reported, as chairman of the Committee on Membership, that O. B. J. Fraser is sending letters to his sub-committee. Lists of potential members received from the Los Angeles, Baltimore, New Jersey, and Chicago Chapters are receiving information about the INSTITUTE. Prof. Marsel is communicating with the Chapter's Membership Committee Chairmen. A re-statement of the INSTITUTE's brochure and a new form of application blank were being prepared by D. H. Killeffer and his sub-committee.

Mr. Sweedler reported, as chairman of the Committee on Revision of the Constitution and By-laws, that these revisions are being carefully prepared for presentation to the membership in 1954.

Mr. Sweedler also reported, as chairman of the Committee to Consider the Social Security Law in reference to self-employed chemists, that he had prepared a statement which appeared in the October 1952 issue of THE CHEMIST, requesting the opinion of the membership. This inquiry showed that five out of six chemists in this classification were not in favor of including self-employed chemists under the provisions of the Social Security Law.

Dr. Royer, chairman of the Committee on Employer-Employee Relations, reported that the Committee is meeting March 30th. He discussed the conference procedures currently being tried in certain chemical companies between employees and management.

Dr. Work announced that the Ohio Chapter will present its Ohio Award to Dr. Games Slayter, F.A.I.C., at a meeting to be held on May first in Toledo, Ohio.

The New England Chapter plans an executive group meeting, March 24th.

The Los Angeles Chapter is arranging an AIC "Get Together" luncheon, March 17th.

Dr. Kelley reported that the New York Chapter held a joint meeting with the New York Section of the American Chemical Society, January 15th, with a Symposium on Public Relations for Chemists. The Student Award meeting of the Chapter will be held March 26th with Dr. Royer as speaker. The Annual Meeting of the Chapter will be held in May. As an experiment, the New York Chapter Council is inviting ten members to be its guests at each Council meeting.

Mr. Donlan reported that the New Jersey Chapter met recently with the North Jersey Section of the ACS to hear a panel discussion on "How to Start Your Own Business."

President Work reported that a number of companies have been considering THE CHEMIST as a medium through which to call attention to their activities of special interest to chemists.

A manual of procedure is being planned for distribution to the Chapters. President Work will appoint a Committee to consider the preparation of such a manual.

In connection with the report of the Employer-Employee Relations Committee, it was suggested that a special issue of THE CHEMIST be prepared to incorporate material of interest to young chemists.

Mr. Concannon announced that the Washington Chapter would meet on April 7th to present its Honor Scroll to Dr. Arno C. Fieldner.

The following new members were elected:

FELLOWS

Balgley, Ely
Market Development Engineer, Market Development Department, Heyden Chemical Corporation, 342 Madison Avenue, New York, N. Y.

Cadwell, Sidney M.
Director, Research and Development, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

Da Fano, Ettore
Chief Chemist, The Sierracin Corporation, 1121 Isabel Street, Burbank, Calif.

Goett, Edward J.
Manager, Sales Development Division, Charles Pfizer and Company, Inc., 11 Bartlett Street, Brooklyn, N. Y.

Kelly, Robert S.
Chief Chemist, Analytical Laboratory, Wilbur B. Driver Company, 150 Riverside Avenue, Newark 4, N. J.

Lang, Maurice
Chief, Battery Laboratory, United States Electric Manufacturing Corporation, 222 West 14th Street, New York, N. Y.

Lawson, Lewis S.
Technical Director, Par Industries, Inc., 2193 East 14th Street, Los Angeles 21, Calif.

Maddock, John Kenneth
Editor, John Wiley and Sons, Inc., 440 Fourth Avenue, New York, N. Y.

Mizell, Louis Richard
Manager, Textile Processing Division, Harris Research Labs., 1246 Taylor Street, N.W., Washington 11, D.C.

Mytelka, Morris
Chief Chemist, Dexter Chemical Company, 819 Edgewater Road, Bronx 59, N. Y.

Radtke, Schrade Fred
Research Supervisor, Pigments Department, E. I. du Pont de Nemours and Company, Inc., Newport, Del.

Schwartz, Anthony Max
Manager, Industrial Chemicals Department, Harris Research Labs., 1246 Taylor Street, N.W., Washington 11, D.C.

Sibert, Merle Eugene
Project Supervisor, Metallurgy Department, Horizons Inc., 2891 East 79th Street, Cleveland 4, Ohio

Stauffer, Robert A.
Vice President, Research, National Research Corporation, Cambridge, Mass.

Steckler, Robert A.
Owner and Manager, R. Steckler Labs., 8200 Harvard Avenue, Cleveland 5, Ohio.

Thiessen, Garrett William
Chairman, Department of Chemistry and Professor of Chemistry, Monmouth College, Monmouth, Ill.

Tour, Sam
Chairman of Board and General Manager, Sam Tour & Company, Inc., 44 Trinity Place, New York 6, N. Y.

Vexler, Darwin
Market Research Representative, Pharmaceutical Division, Commercial Solvents Corporation, 260 Madison Avenue, New York 16, N. Y.

Wesley, W. Andrew
Assistant Director, Research Laboratory, International Nickel Company, Inc., Bayonne, N. J.

Womer, Robert Leroy
Manager, New Products Research, General Research Organization, Olin Industries, Inc., East Alton, Ill.

MEMBERS

Barker, Graham
Chemist, Sales and Technical Service, Diamond Alkali Company, Organic Chemical Division, 80 Lister Avenue, Newark, N. J.

Bleier, Emre
Plant Manager, Chemist, Wonder Wash Corporation, 710 Milton Road, Rye, N. Y.

Filipic, Victor Joseph
Chemist, Barrett Division, Margaret and Bermuda Streets, Philadelphia, Pa.

Ginnings, Paul Roll
Research Chemist, Textile Department, Goodyear Tire and Rubber Company, Akron, O.

McDonough, Vincent Francis
Analytical Chemist, Analytical Laboratory, General Electric Company, 1099 Ivanhoe Road, Cleveland 10, Ohio.

Schlakman, Irving A.
Head, Pharmaceutical Research and Development, Stein, Hall and Company, Inc., 285 Madison Avenue, New York 17, N. Y.

ASSOCIATE

Novovich, Smilya
Junior Chemist, Quality Control, Ciba Pharmaceutical Products, Inc., Summit, N. J.

RAISED FROM ASSOCIATE TO FELLOW

Moesel, F. Charles
Chemical Engineer, % Chief of Naval Operations, O.P. 322 F 2 Navy Department, Washington 25, D.C.

RAISED FROM ASSOCIATE TO MEMBER

Clodi, Charles E.
Technologist, Technical Service Department, Socony-Vacuum Oil Company, 412 Greenpoint Avenue, Brooklyn 22, N. Y.

REINSTATED TO FELLOW

Celmer, Ralph Frank
Director of Research, Concord Grape Co-operative Development Association, Penn Yan, N. Y.

AIC Activities

C. P. Neidig, F.A.I.C.

Chicago Chapter

Chairman, Dr. B. S. Friedman
Chairman-elect, H. F. Schwarz
Vice-chairman, Mary Alexander
Secretary-treasurer, W. Jacobson
Representative to National Council, Dr. Gustav Egloff

Chemists Are Human?

While there may be some doubtful specimens, chemists are generally accepted as human beings. And being human, they have a few foibles. One such foible is that of thinking of themselves only as chemists, and concerning themselves only with chemistry.

Another human weakness is that of accepting prejudicial views of other people without applying scientific standards of verification.

A chemist should be no less scientific in his appraisal and acceptance of standards in human relations than he is in his acceptance of theories and laws explaining natural phenomena.

The understanding of human relations is as vital in business as it is in the home and community. Skill in human relations implies an innate personal kindness. All of us could do with a greater degree of comprehension and skill in dealing with people.

Come then to listen, to question and discuss.

Subject: The Value of Better Human Relations in Industry.

Speakers: Dr. Leo K. Bishop, vice president and regional director of N.C.C.J. Mr. Russell Babcock, chairman, Illinois State Commission on Human Relations.

Discussion Leader: Dr. William I. Harber, Research and Development Corporation.

Time: Friday, May 8, 1953. Cocktails 6:00 p.m.; Dinner 6:30.
Place: Chicago Engineers Club, 314 S. Federal, Chicago, Ill.
Reservations:
John Krc, Jr. (CAlumet 5-9600)
Armour Research Foundation
Illinois Institute of Technology
Chicago 16, Ill.

New Jersey Chapter

Chairman, Dr. James B. Allison
Secretary, Erving Arundale
Treasurer, Dr. W. A. Raimond
Representative to National Council, T. R. Donlan

To Honor Dr. Merz

The New Jersey Chapter will meet, May fifth, at the Military Park Hotel, Newark, N. J., to present its second Honor Scroll to Dr. August Merz, formerly vice president of Calco Chemical Company. Dr. M. L. Crossley, Hon. AIC, will speak for the recipient.

Student awards will be made to Ronald Elliott Cape of Princeton University and to Peter Joseph Wojtowicz of Rutgers University.

Prof. Stephen J. Toth of the New Jersey State Agricultural Experiment Station, will speak on "Soil Conditioners."

Please make reservations for the dinner and meeting with Dr. W. R. Sullivan, Hoffmann-La Roche, Inc., Nutley, N. J. (Phone: Nutley 2-5000, Ext. 346.)

Los Angeles Chapter

Chairman, T. F. Bewley
Vice Chairman, Peter Stupin
Corresponding Secretary, Blanche Simons
Treasurer, Don Remer
Representative to National Council, Manuel Tubis

Synthetic Rubber

The Los Angeles Chapter met March 31st at the Eleda Restaurant, Los Angeles. Dr. Harry L. Fisher, Hon. AIC, was the main speaker. His subject was "Synthetic Rubber and Its Meaning." Dr. Fisher is president-elect of The American Chemical Society, and has been national president of the AIC (1940-1942). One of the world's authorities on rubber, he is now associated with the University of Southern California.

The preparation of synthetic rubber goes back seventy-five years and its synthesis was studied particularly around 1910 when natural rubber reached its highest price, $3.12. During World War I the Germans manufactured 2350 tons of "Methyl Rubber," and from 1925-35 they laid much of the foundation of our present knowledge of synthetic rubbers. It should be stated, however, that the first commercial synthetic rubber, Thiokol, was produced in our own country in 1930 and was not connected at all with German developments.

Since the natural rubber hydrocarbon has never been synthesized, it would appear that the term "synthetic rubber" is a misnomer. However, since the word rubber is used for the name of a type of product rather than for a chemical compound its use is probably justified.

Synthetic rubbers are used because they have better properties than natural rubber for certain purposes and because they supply our needs when it may not be possible to obtain natural rubber from the plantations in the Far East. GR-S is the standard government rubber that was developed and manufactured in this country during World War II and helped tremendously in our part in winning the war. It is prepared from butadiene, which is a gas manufactured from petroleum, natural gas, and alcohol, and from styrene, a fairly high-boiling liquid, which comes from coal tar, alcohol, and petroleum.

Seven-hundred fifty-thousand long tons of GR-S will be produced this year. Two types are manufactured, each in an emulsion, one at 122°F. and the other, the more recent, at 41°F. The latter GR-S is known as cold rubber because of the temperature at which it is prepared, and produces the best tire tread ever manufactured. It is a general all-purpose rubber. When flexed, GR-S gives off more heat than natural rubber and therefore cannot be used to large extent in the carcass of large truck and bus tires. The hysteresis value involved is its greatest detriment for complete substitution of natural rubber.

Butyl synthetic rubber is of outstanding value for inner tubes. Neoprene, our second commercial synthetic rubber developed in 1932, is more like natural rubber than any of the other synthetic rubbers but better in weather aging and resistance to oils and flame. Nitrile rubbers are prepared from butadiene and acrylonitrile and are strongly resistant to oil and heat. Silicone rubbers can be used from —120° to 500° F.; Thiokol swells less in oils and solvents than any other rubber.

Two synthetic rubbers which are now in the pilot plant stage will bear watching. Vulcollan was developed in Germany and work on it has already been announced in this country. It has unusually high tensile strength and abrasion and tear resistance, and probably can be used in tires without the use of carbon black and fabric. Hypalon is very different and cheaper, being chlorosulfonated polyethylene, and is being developed in this country. Approximately 900,000 long tons of synthetic rubber will be manufactured in the U.S.A. this year, and probably 400,000 long tons of natural rubber will be imported. It is of interest that 75-80 per cent of the total rubber will be used for tires and tubes and other parts of automobiles.

New York Chapter

Chairman, Karl M. Herstein
Vice Chairman, Savery F. Coneybear
Secretary-treasurer, Richard L. Moore
Representative to National Council, Dr. Maurice J. Kelley

Innovation

On March 12th, the Council of the New York Chapter, AIC, tried an experiment which it plans to continue for future meetings. In order to acquaint the members of the Chapter with the workings of its council and the way its business is conducted, a group of young members and prospective members were invited to sit in at a regular Council meeting. Harry Bennett was chairman of a special committee, the Council Participation Committee, to arrange for this feature. The officers and councilors present were Karl M. Herstein, chairman of the Chapter, Joseph T. Bashour, Harry Bennett, Samuel Cohen, S. F. Coneybear, Dr. Donald F. Othmer, Dr. Robert Ginell, Dr. A. F. Guiteras, Dr. John Happel, Dr. M. J. Kelley, and Richard F. Moore.

The guests were Graham Barker, Bernard Berkeley, Emre Bleier, Jack Dollinger, Morris B. Jacobs, Robert Mesrobian, Lee Prince, Irving Schlakman, Shep Stigman and Darwin Vexler.

All of the guests were very much interested in the proceedings and felt that they had learned a great deal about the *raison d'etre* and functioning of the Chapter and volunteered to work on one or another of the Committees which had reported at the Council meeting. It is felt that by continuing this procedure with a new series of guests for each Council meeting, a considerably larger fraction of the Chapter membership can be interested in and induced to participate to a much greater extent in the activities of the AIC.

Washington Chapter

Chairman, Milton Harris
Vice Chairman, P. E. Reichardt
Secretary, Wesley R. Koster
Treasurer, John F. Williams
Representative to National Council, Milton Harris

Dr. Fieldner Honored

The Annual Honor Award Dinner of the Washington Chapter in behalf of Dr. Arno C. Fieldner will be held April 7th, at the Roger Smith Hotel, Washington, D.C.

Cancer Research

The March meeting of the Washington Chapter was held at Bonat's Restaurant, Washington, D.C., on the eleventh. Vice Chairman Paul E. Reichardt officiated. Mr. A. F. Parks, in the absence of Treasurer Williams, reported for the treasurer. He announced that the next regular Chapter luncheon will be held on the second Wednesday of May.

Arthur Schroder, chairman of the Award Committee, reported that preparations for the annual dinner honoring Dr. Fieldner are nearly completed, and that preliminary indications point toward an event of outstanding significance for chemists throughout the eastern area.

Dr. John R. Heller, director of the National Cancer Institute, was then introduced. He spoke on the work being done on cancer research not only at Bethesda, Maryland, but all over the world. The subsequent questions posed by the members indicated the high degree of interest in this subject and its meaning for all humanity. It was significant to note that a very large part of the Institute's budget is devoted to chemical research — particularly on the amino acids and their relationship to the physiological growth of cancer cells.

—W. R. Koster, F.A.I.C.

Will You Come?

April 7, 1953. Washington Chapter. Achievement Award Dinner. Roger Smith Hotel, Washington, D.C. 6:00 p.m. Award to Dr. Arno C. Fieldner. Speakers: Dr. William Yant, director of research, Mines Safety Appliance Company of Pittsburgh, "Fieldner, the Man;" and Dr. Alden Emery, secretary, American Chemical Society, "Fieldner and his Professional Activities."

April 15, 1953. Chicago Chapter. Dinner 6:00 p.m. Chicago Engineers Club, 314 S. Federal St., Chicago, Ill. Speaker: Dr. John T. Rettaliata, president, Illinois Inst. of Tech., "How to Improve Your Status with Management." Discussion Leader: A. W. Chapman, Celotex Corp.

May 1, 1953. Ohio Chapter. Annual Meeting, Toledo, Ohio. Morning: Plant trip to Owens-Illinois Glass Co. Afternoon: Business meeting, Dura Glass Center of Owens-Illinois Glass Co. Evening: Ohio Award Dinner, Hillcrest Hotel. The award will be presented to Dr. Games Slayter, F.A.I.C. For information: Harold M. Olson, Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio.

May 5, 1953. New Jersey Chapter. Military Park Hotel, Newark, N. J. Honor Scroll to Dr. August Merz. (See page 216.)

May 7, 1953. Pennsylvania Chapter. Dr. Sidney D. Kirkpatrick, editorial director, *Chemical Engineering*, will speak on "The Rocky Road of the Chemical Professor." At this meeting Student Medals will be awarded. For information and reservations: Dr. V. V. Bellino, Barrett Div., Allied Chemical & Dye Corp., Philadelphia 37, Pa. (JE-3-3000).

May 8, 1953. Chicago Chapter, Engineers Club, 314 S. Federal, Chicago, Ill. Cocktails 6:00, Dinner 6:30; Meeting 7:30. Subject: "The Value of Better Human Relations in Industry. Speakers: Dr. Leo K. Bishop, vice president and regional director of N.C.C.J. Mr. Russell Babcock, chairman, Illinois State Commission on Human Relations. Discussion Leader: Dr. William I. Harber, Research & Development Corp. Reservations: John Krc, Jr. Armour Research Foundation, Illinois Institute of Technology, Chicago 16, Ill.

May 12-13, 1953. Annual Meeting of The American Institute of Chemists. Benjamin Franklin Hotel, Philadelphia, Pa. Presentation of A.I.C. Gold Medal to Dr. J. C. Warner, president of Carnegie Institute of Technology. (See page 172.)

May 21, 1953. New York Chapter. Hotel Commodore, New York, N. Y. Presentation of Honor Scroll to Dr. Herman F. Mark, F.A.I.C., Director Institute of Polymer Research, Polytechnic Institute of Brooklyn.

Opportunities

Doris Eager, M.A.I.C.

Chemists Available

Laboratory or Group Leader: Ph.D. Physical chemistry. Ten years research and development — ceramics, minerals, pigments, including some administrative experience. Surface chemistry, microscopy, and high-temperature reactions. Technical writing, literature surveys, research planning. Member professional societies. Several publications. Box 40, THE CHEMIST.

Purchasing Agent: 2-years' experience buying all types chemical plant equipment with engineering-construction concern; 2 years' marketing-production experience. Graduate work business administration, organic chemistry. Box 42, THE CHEMIST.

Organic Chemist: Ph.D. 1945. F.A.I.C. Training and experience in organic medicinals and pharmaceuticals, including formulation work from laboratory through full-scale production. Interested only in positions of responsibility. Age 33, family. Box 44, THE CHEMIST.

Positions Available

Two Directors of Research: For Midwest. Experienced in directing sizeable group for research above the group leader level. Pure research, involves the direction of 20 to 30 people. Salary $15,000 to $18,000 up. (1) Metallurgy: Should know properties, uses and methods of processing of all types of common and rare metals. (2) Director of chemical-physical research: Ph.D. Physical chemistry. Should also known thin films, lubricants, colloidal chemistry, detergents, etc. Box 41, THE CHEMIST.

Chemical Engineer—Economic Analyst: Chemical engineer able to guide commercial evaluation studies of new products, processes and application of existing products in organic field. Extensive background in chemical costs required, plus information on accounting, finance, market research, and statistics. Salary $15,000.

Development Engineer — Organic Chemist: Background of petroleum chemistry. M.S. or Ph.D. degree or equivalent. Experience should include commercial experience in sales, product development or market research. $15,000.

Development Engineer—High Polymer: Chemist or Chemical Engineer, well grounded in high polymer and plastic technology preferably in vinyls. M.S. or Ph.D. degree or equivalent. At least five years experience should include commercial experience in sales, product development or market research. $15.000.

Location Eastern seaboard. Travel including attendance at professional meetings. For the above three positions reply to Box 43, THE CHEMIST.

Senior Electronics Engineer: B.S. in electronic engineering required. M.S. preferred. Minimum of 5 years' experience in electronic equipment industry. Mastery of engineering fundamentals and thorough knowledge of general production practice. Essential: familiarity with applications and limitations of machine tools used in sheet metal work; understanding of drafting practice. Age 25-35. Salary open. Box 45, THE CHEMIST.

Chemists: Male or female. College graduates. Major in chemistry, one to 2 years' experience, preferably in food field. Box 47, THE CHEMIST.

Chemist: Degree in analytical, organic, or bio-chemistry. 1 year's experience preferably in clinical chemistry, foods, waters, sewages, etc. Salary $3240. State Employment Commissioner, 31 Light St., Baltimore 2, Md.

For Your Library

L. Farkas Memorial Volume

Editors: Adalbert Farkas, F.A.I.C., and Eugene P. Wigner. Research Council of Israel, Jerusalem, 1952. *Price* $6.00

All of us have attended funerals at which the respect and affection in which the departed was held are demonstrated by floral displays. It is a very precise comparison to characterize this volume in the same fashion. The custom is of European rather than of American origin in most instances, but has considerable to commend it. It is quite fitting that the friends and co-workers of a scientist of stature should testify their regard for him by contributing a scientific paper to a memorial volume.

The standing of Ladislaus Farkas is well-demonstrated by the list of contributors to the present volume, which includes, among others, Sir Eric Rideal, Harold Urey, Herman Mark, Henry Eyring and V. I. Komarewsky. Having said this there is little more to be said.

Obviously, a volume of so heterogeneous a nature cannot hope for too wide a circulation. Therefore, the major scientific contributions of the contributors to the volume would not reach their widest publicity, nor be so readily accessible here as in the more usual media.

We have, therefore, a collection of sincere contributions to science and testimonials to Farkas, but it is primarily from this point of view that they must be considered, and not as major scientific contributions.

It is interesting to note that the volume was published in Israel as the first special

publication of the Research Council of Israel. Its format is good and the typography is excellent, especially considering the substantial amount of special work required to include the various formulas and charts which are required.

The reviewer has noted only one typographical error which appears in the Table of Contents and is a mis-spelling of Hugh S. Taylor.

For specialists in physical chemistry there will be a good deal of interesting reading to be found.

—KARL M. HERSTEIN, F.A.I.C.

Modern Science and Modern Man

By Dr. James B. Conant, Hon. AIC. Columbia University Press. 1952. 111 pp. $2.25

Among all of the needs of modern man, one of the most important is for a philosopher and guide in this age of swift-paced science. Dr. Conant, unlike many who undertake this difficult role, develops his thinking and his counsel to troubled people from a deep-rooted understanding of what science is about and how it approaches the problems of our modern world. This series of four lectures, comprising the Bampton Lectures for 1952, carries ahead the author's ideas of the mutual interaction of science and scientific thinking on the one hand and people and their philosophical gropings on the other. These basic problems were discussed before in Dr. Conant's "Our Fighting Faith," "On Understanding Science," "Education in a Divided World," and "Science and Common Sense." Each of these contributes vital bits to a sound philosophy for scientists and laymen alike. All five of them should be required reading for every scientist who seeks to place himself in relation to the world about him and especially to the people in it. This is *must* reading, even for a busy chemist.

—D. H. KILLEFFER, F.A.I.C.

Physical Biochemistry

By Henry B. Bull. John Wiley & Sons, Inc. 355 *pp.* 6" x 9½". $5.75.

Physical chemistry as applied to biology is treated in a manner to indicate its use to measure and understand the energy relationships of chemical reactions, oxidation-reduction potentials, electrical phenomena, osmosis, diffusion and viscosity. Polymers and their special phenomena are discussed and elucidated.

—DR. JOHN A. STEFFENS, F.A.I.C.

Chemical Books Abroad

RUDOLPH SEIDEN, F.A.I.C.

Edito Cantor, Aulendorf, Wuertt.: *Histamin und Antihistamine, Vol II,* by Hans Haas; 1952, 156 pp.; DM 9.80.—In the November, 1951, issue of THE CHEMIST Dr. Haas' book on antihistaminic preparations and their medical indications was reviewed. Since then so many new findings have been made that the edition of a supplementary volume has become necessary. It contains a great many tables, hundreds of literature sources and a most helpful 11-page index which refers to both volumes. • *Rote Liste* 1952; 767 pp. DM15.—The new listing of pharmaceuticals, compiled by the association of the pharmaceutical industry in West Germany, contains 300 more products than the 1949 edition (see THE CHEMIST of November, 1950). The 4,800 preparations are compiled alphabetically and described as to composition, indications, dosage, unit-sizes, and prices.

Wissenschaftliche Verlagsgesellschaft, Stuttgart 1: *Adolf von Baeyer,* by Karl Schmorl; 1952, 214 pp. (15 ill.); DM 12.50.—This small book devoted to the great Chemist (Johann Friedrich Wilhelm) Adolf Baeyer (1835-1917), reveals how full and rich his life was. His many scientific investigations into the structure of organic compounds were carried out at the universities of Strassburg and Munich and helped create the German chemical

industry. They did not bring him monetary success, but fame and in 1905, the Nobel prize. His children and grandchildren inherited not only his great scientific mind, but also his partly Jewish blood and, therefore, were fired from their positions when the Nazis came to power; some of the Baeyers now live in North America. • *Taschenbuch der Kitte und Klebstoffe*, by K. Miksch and E. Plath; 3rd ed., 366 pp.; DM 19.50.—A discussion of putty, putty-like products, and all types of adhesives for general as well as very special uses; with hundreds of tested formulas and manufacturing suggestions.

Something New

"Resinox GP-1000, a New All-Purpose Phenolic Plastic." Information. Plastics Div., Monsanto Chemical Company, Springfield, Mass.

"Solving Public Relations Problems." Book by Verne Burnett. Query for prices. B. C. Forbes & Sons Publishing Co., Inc., 80 Fifth Ave., New York 11, N. Y.

"Six New Reagents by Fisher." Information. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

"16-mm Sound Film on the Electron Microscope." For information contact: C. J. Woods, North American Philips Company, Inc., 750 South Fulton Ave., Mount Vernon, N. Y.

"Draw-In-Dex Blueprint Cabinet." Brochure. Empire Development Corp. 15 Park Row, New York 38, N. Y.

"A new scoop and roller-type pump." Information. Hypro Engineering, Inc., North Washington Ave., Minneapolis 1, Minn.

"Quik-Label, an improved marking method for hazardous material containers." W. H. Brady Co., 727 W. Glendale Ave., Milwaukee 12, Wis.

"Sodium Hydride Descaling." Bulletin. Ethyl Corp., 100 Park Ave., New York 17, N. Y.

"What Makes A Magnet?" Chart. Eriez Mfg. Co., 1945 Grove Drive, Erie, Pa.

"Emson" volumetric flasks. Information. E. Machlett and Son, 220 E. 23rd St., New York 10, N. Y.

"Properties and Essential Information For the Safe Handling of Bromine." Data Sheet SD-49. $0.25. Manufacturing Chemists' Association, Inc., 246 Woodward Bldg., Washington 5, D.C.

"Vac-on" vacuum switch." Informatino. Jaycon Associates, 404 N. Washington Ave., Minneapolis, Minn.

"Precision Induction Period Calculator." Information. Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

"Questions and Answers about the RLM Label." Booklet. RLM Standards Institute, Suite 818, 326 W. Madison St., Chicago 6, Ill.

"Neg-A-Lith, low-cost film for duplicating machines." Information. Michael Lith Co., 145 West 45th St., New York, N. Y.

"Saf-Hed-Hat," a safety hat of fiber glass. Information. United States Safety Service Co., 1215 McGee St., Kansas City, Mo.

"Simplytrol," meter-relay with booster contacts. Bulletin G-1 and CMR-79. Assembly Products Inc., Main at Bell St., Chagrin Falls, Ohio.

"Teflomatic Burettes, new line of automatic burettes." Information. Scientific Glass Apparatus Co., Inc. Bloomfield, N. J.

"Serological Water Baths." Bulletin. Chicago Surgical and Electrical Co., 217 N. Desplaines St., Chicago 6, Ill.

"Transparent Plastic Pipe." Information. Elmer E. Mills Corp., 2930 N. Ashland Ave., Chicago 13, Ill.

"The Alco Products Story." Industrial sound film. Alco Products Division, American Locomotive Co., Dunkirk, N. Y.

Condensates

Ed. F. Degering, F.A.I.C.

Buckman Labs., Inc.

About $4.2 billion has been spent in the past four years on petroleum supplies and projects for the European recovery program, the Mutual Security Administration estimates.

With the completion of the plant at Pensacola, Florida, by Chemstrand, and one at Enka, N. C., by American Enka Corporation, two licensees will be producing nylon under the du Pont patent.

The total oil energy used in farming is about 750-million horsepower, which is more than that used by all other American industries.

The best extinguishers of gasoline fires, in order of decreasing effectiveness, are: Freon 11, Freon 12, Freon 21, carbon dioxide, automobile-exhaust gas, and nitrogen.

Crafty men condemn study, simple men admire it, wise men use it.

—Francis Bacon

Federal expenditures for research and development are well beyond two-billion per year, of which 72 per cent is being spent by the Department of Defense.

The production of ethylene glycol during 1952 totaled slightly over three-quarters of a billion pounds compared to slightly over half a billion pounds during 1951.

An expanding economy is, of course, a prosperous one. Increased capital investment in machinery has meant increasing profits for businessmen and increasing real income for labor, as goods are produced in greater volume at lower cost.

In 1945, the total wholesale value of petroleum products consumed in the United States was $3,732,560,000. In 1951, the total had risen to $9,370,568,000. Motor fuel alone rose from $2,202,460,000 in 1945 to $5,458,117,000 in 1951.

Opportunities: For industrial growth in New England, featured in the *Monthly Review*, September, 1952, of the Federal Reserve Bank of Boston, Boston 6, Mass. The survey was made by Arthur D. Little, Inc., Cambridge, Mass.

Announced: By Dr. N. N. T. Samaras, F.A.I.C., director, the appointment of William E. Weesner and Bernard S. Wildi as group leaders in the organic research section at the Central Research Department of Monsanto Chemical Co., St. Louis 4, Mo.

The Selection of Equipment

(Reported by John C. Somers, Chairman, Management Division, Metropolitan Section, American Society of Mechanical Engineers; Manager of Engineering, Industrial Products Engineering Co., Long Island City, N. Y.)

"Research is simply having a series of problems and then organizing the manpower, facilities, and the funds to do the research," Dr. Edwin F. Pike, consultant, stated, speaking before the Technical Session of the Management Division, American Society of Mechanical Engineers in New York, recently.

"What problems would you throw into the research hopper?" he queried, and then recommended that the industrial plant canvass all key personnel asking them what subjects they would recommend. From these the company can get accurate information on justified projects. Once a subject is selected, the next most important consideration becomes that of equipment for the project, because without these facilities, it cannot be accomplished.

In this connection, you must have the right equipment to do the job. It is wrong to try to mix an emulsion with a standard propeller mixer when a colloidal mill is needed. It is equally wrong to lay out the colloid mill in the laboratory or in the test section of the plant without having the proper tanks, conveyers, feeders, and measuring devices, automatic or otherwise. Without the proper layout, the whole test may be wrong, because you are not relying on a hand operation and the work of the machinery or equipment must be accurate.

Finally, though you have the proper equipment, you must also be sure that it is the type, size, and arrangement, including the proper motors, needed to do the specific job. There must be brains behind the selection and layout of equipment. To the chemist this means that the buyer must give great care and attention to the selection not only of the equip ment but of the engineers or contractors or fabricators who sell the equipment. It is also desirable that the engineering and fabricating company be familiar with the type of project.

The wise selection of equipment plays an important part in the success of any project in the chemical, industry, or food field.

Speaker: Dr. Alexander Silverman, Hon. AIC, professor of chemistry, emeritus, University of Pittsburgh, consultant on glass, who spoke on "Goggles in the Service of Man," at the Fiftieth Anniversary of L. J. Houze Convex Glass Co., at Point Marion, Pa. His paper is printed in the *National Glass Budget*, 541 Wood St., Pittsburgh 22, Pa., September 27, 1952.

How Celite Mineral Fillers make a product free-flowing . . .

Keeping fertilizers "On the run"

REALIZING their product is one that cannot "cake-up" and still survive in a competitive market, leading producers of fertilizer use one of the Celite Mineral Fillers as a standard "anti-caking" ingredient.

The ability of Celite Fillers to keep a product free-flowing results from their high absorption properties and unique diatom structure—properties which make them unusually effective safeguards against caking in deliquescent materials. They are two of the unusual physical characteristics that adapt these diatomaceous silica powders to numerous industrial uses.

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You may find Celite the "extra something" needed to lift your product above competition. Why not discuss its application to your problem with a Celite engineer? Or write for further information and samples to Johns-Manville, Box 60, New York 16, N. Y. In Canada: 199 Bay St., Toronto, Ont.

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- Elimination of Caking
- Higher Melting Point
- Better Dry Mixing
- Improved Dispersion

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